

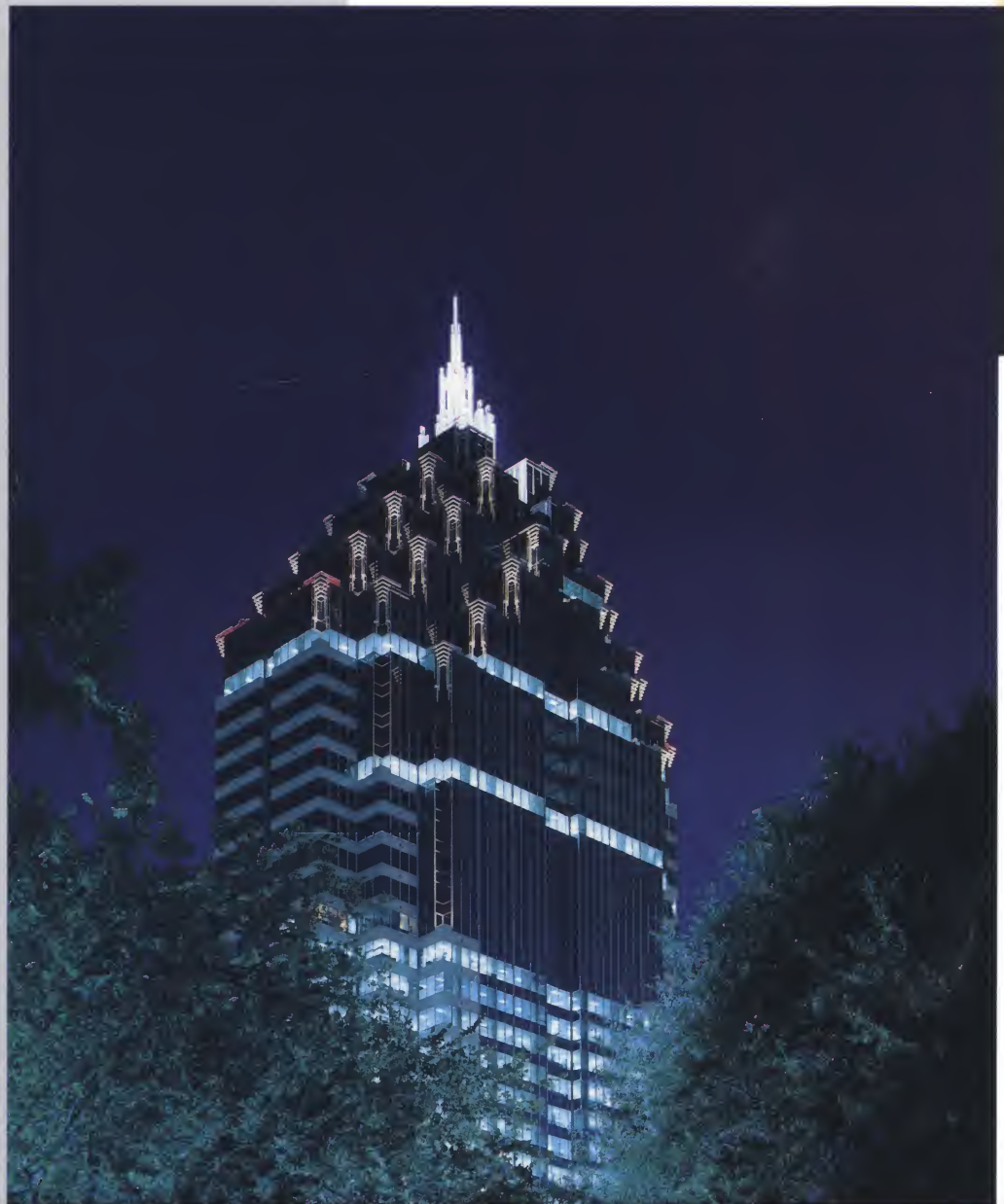
THERMAFIBER®

Life-Safety

Insulation Systems

*Life-safety insulations
help make buildings safe
for building occupants*

USG Interiors, Inc.



USG

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On the cover:
THE PROMENADE
Atlanta, Georgia

Architect:
THOMPSON, VENTULETT, STAINBACK & ASSOCIATES

SUPERIOR FIRE CONTAINMENT PRODUCTS

The superior fire protection of THERMAFIBER insulation comes from its composition of mineral fibers with an ability to resist temperatures over 2,000°F (1,100°C). By contrast, glass fiber insulations begin to disintegrate at about 1,050°F (565°C).

THERMAFIBER insulations are rated "noncombustible" as defined by NFPA Standard 220. With foil facing and SMOKE SEAL compound, THERMAFIBER insulations also impede passage of smoke.

THERMAFIBER insulations contain no asbestos. They are moisture-resistant, noncorrosive, nondegrading, mildew and vermin-proof. If exposed to damp conditions, THERMAFIBER insulations adsorb less than one percent moisture.

The exceptional durability of THERMAFIBER insulations provide long-term retention of insulating values. Clean, positive mechanical attachment of dry units offers installation convenience and economy in any weather and at any temperature.

SMOKE SEAL compound, a fire-resistant sealant, is used in conjunction with curtain wall and/or safing insulations to make the THERMAFIBER Fire/Smoke-Stop System the most comprehensive, yet economical system available for controlling both fire and smoke. It is conveniently applied with standard caulking guns or trowel applied from bulk pails.

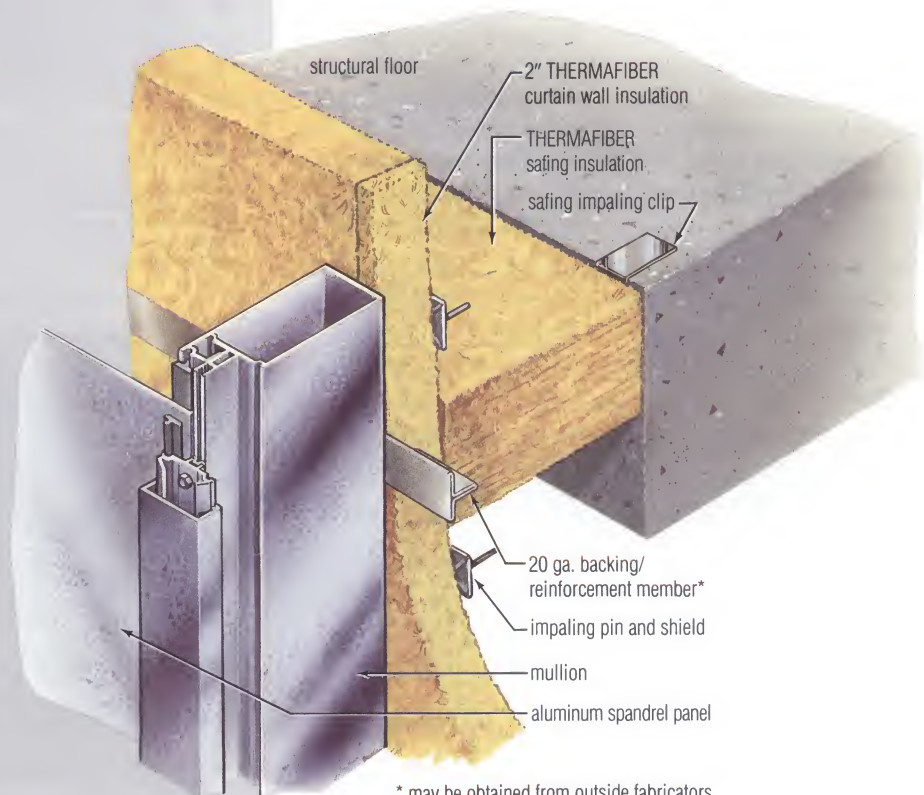
Adequate protection against the spread of fire at the curtain wall requires that both curtain wall and safing insulations provide maximum protection in containing

fire. The use of glass fiber insulation alone or in combination with THERMAFIBER insulation simply cannot provide the same level of protection as a total THERMAFIBER system.

THERMAFIBER curtain wall insulations protect spandrel panels and restrict the spread of fire to floors above. THERMAFIBER safing insulations fill the opening between the slab perimeter and the curtain wall insulation to inhibit the spread of fire through this opening.

Life-safety goals can only be reached by using high-melt-point products for both curtain wall insulation and safing. High-melt-point products include mineral fiber THERMAFIBER safing insulation and curtain wall insulation but do not include glass fiber insulations. Use of low-melt-point curtain wall insulation in conjunction with safing may result in failure of the life-safety system.

**THERMAFIBER Life Safety System
Detail used on Outdoor Fire Test
(See page 4)**



* may be obtained from outside fabricators

SUPERIOR FIRE CONTAINMENT PERFORMANCE

Performance Tested A full-scale fire test was conducted to compare the effectiveness of THERMAFIBER curtain wall insulation vs. glass fiber curtain wall insulation. The side-by-side test was conducted in a two-story, outdoor testing facility at the USG Corporation Research Center at Libertyville, Illinois.

The structure was divided vertically to form two separate units. Each was faced with identical curtain walls comprised of aluminum spandrel panels and vision glass mounted to aluminum mullion framing. Only the insulation was different. Wood cribs with 7.5 lbs. of Class A combustibles for each sq. ft. of floor area were used to fuel the test. A synopsis of the test is shown below.

Close-up inspection of the curtain wall assemblies following the test indicated that when the first spandrel panel on the glass fiber unit failed, the glass fiber insulation had

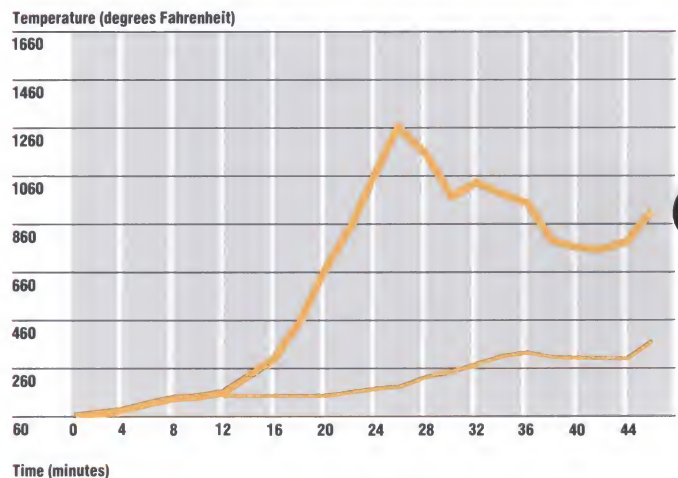
already disintegrated, and the wall had been breached at the floor/wall intersection and along the vertical joints of the glass fiber curtain wall insulation. (See photo, bottom left). As a result of the disintegration of the glass fiber insulation, the safing detail was also compromised. This created openings between the structural floor and the curtain wall and provided another path for the spread of fire. No visible deterioration or separation took place on the THERMAFIBER curtain wall or safing insulation on the THERMAFIBER insulation unit (see photo bottom right).

A comparison of the results showed that, on the glass fiber unit, all three aluminum spandrel panels melted while all of the spandrel panels on the THERMAFIBER insulation unit remained intact and stayed in place. On the glass fiber unit, all three of the window heads melted while none of the

• 8 min. 50 sec.	First lower-floor vision glass panel shatters.
• 14 min.	Last lower-floor vision glass panel shatters.
• 15 min.	Window head melts on glass fiber unit.
• 20 min.	Aluminum spandrel panels melt on glass fiber unit.
• 21 min.	Window head on glass fiber unit falls, and middle spandrel panel is dislodged.
• 24 min.	Middle spandrel panel on glass fiber unit falls, showing partially disintegrated insulation above second floor.
• 25 min. 20 sec.	Second spandrel panel on glass fiber unit is dislodged.
• 31 min.	Part of third spandrel panel on glass fiber unit falls away.
• 46 min.	Test is terminated. No visible deterioration or separation of THERMAFIBER curtain wall insulation took place.



In a comparative test, glass fiber curtain wall insulation disintegrated, dislodging spandrel panel 21 minutes into test (right). There was no visible damage to curtain wall on THERMAFIBER insulation unit (left).



Graph shows temperatures of thermocouples placed at mid-thickness of curtain wall insulation at second floor levels of both units.

— THERMAFIBER Insulation Unit curtain wall cavity
— Glass Fiber Unit curtain wall cavity



Inspection following test shows disintegration and horizontal breach of glass fiber insulation (left), while THERMAFIBER insulation shows no sign of damage (right).

THERMAFIBER insulation unit window heads showed any evidence of melting. Glass fiber insulation below the second floor disintegrated and fell away while the THERMAFIBER insulation remained intact below and above the second floor level.

Analysis of the temperatures monitored by the thermocouples also provided an insight into the performance of the two insulation systems (see graph on page 4).

The data generated during this test demonstrated that fire containment can be achieved using THERMAFIBER cur-

tain wall insulation for protection of spandrel panels and supporting structural members and THERMAFIBER safing insulation for perimeter fire-stopping. However, this containment cannot be realized using thermal insulations having low melt points, such as glass fiber.

THERMAFIBER FIRE/SMOKE-STOP SYSTEM

Comprehensive Protection for Complete High-Rise Safety

The first priority in building safety is containment of both fire and smoke to the area of origin. For high-rise buildings, especially, this requires (1) eliminating the "flue opening" between the floor slab and spandrel panel, (2) constructing a fire containment barrier that causes the flames exiting the vision area on one floor to be diverted and cooled so that they cannot ignite combustibles on the floor above and (3) blocking smoke and flames through poke-through openings.

The USG Interiors Fire/Smoke-Stop System

protects both perimeters and poke-through openings by combining THERMAFIBER safing insulation, THERMAFIBER curtain wall insulation and THERMAFIBER SMOKE SEAL compound.

How the THERMAFIBER Fire/Smoke-Stop System Works

THERMAFIBER curtain wall and safing insulations have effectively stopped fire for many years. However, experience has shown smoke to be often more life-threatening than fire.

The Fire/Smoke-Stop System for perimeter protection combines foil-faced insulation with a specially designed fire and smoke resistant sealant to

form an effective barrier to the passage of smoke as well as fire.

At slab perimeters, THERMAFIBER SMOKE SEAL compound is used to seal the foil backing of THERMAFIBER safing insulation to both the foil backing of THERMAFIBER curtain wall insulation and also to the floor slab (see photo 1). The sealed foil completely bridges the top of the opening between the slab and the curtain wall, effectively eliminating the passage of smoke through this area. Unfaced THERMAFIBER safing insulation can also be used and topped off with a 1/2" layer of SMOKE SEAL compound.

For poke-through openings in 4 1/2" or greater thickness floor slabs, a 2 1/2" thickness of unfaced THERMAFIBER safing insulation is friction fitted into the opening around a metal penetrant and a 2" layer of THERMAFIBER SMOKE SEAL compound is applied on top with a caulking gun or trowel to seal the opening (see photos 2 and 3). Concrete block wall openings are similarly filled with safing insulation and sandwiched between equal layers of compound (minimum of 2" each side). The result is UL classified through-penetration firestop system No. 165 with a 2 or 3-hour fire rating.

Photo 1



THERMAFIBER Fire/Smoke-Stop System includes foil-faced curtain wall and safing insulations plus THERMAFIBER SMOKE SEAL compound to seal all joints.

Photo 2



THERMAFIBER safing provides a fire barrier at poke-through openings.

Photo 3



THERMAFIBER SMOKE SEAL compound applied to THERMAFIBER safing insulation effectively blocks particulate, smoke and air movement. System carries UL Classification #165 for through penetration firestops, 2 hr. and 3 hr. ratings.

Through-Penetration Firestop System No. 165

Ratings: F-2 hr. and 3 hr.; T-0 hr. and ¾ hr. (see item 3 below)

1. Floor or Wall Assembly—Min. 4½" thick lightweight or normal weight concrete floor. Min. 6½" thick lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. See Concrete Block (CAZT) category in Fire Resistance Directory for names of manufacturers.

2. Steel Sleeve—Optional, Schedule 40 (or heavier) steel sleeves.

3. Steel Pipe or Conduit—Nom. 4" diam. (or smaller) electrical metallic tubing, nom. 6" diam. (or smaller) rigid steel conduit or nom. 6" diam. (or smaller) Schedule 10S (or heavier) steel pipe.

The T and F ratings of the system are dependent upon the diam. of the pipe or conduit and annular space between the pipe or conduit and the periphery of the opening as shown in the table below.

Max. Diam. of Steel Pipe or Conduit (in.)	Nom. Annular Space (in.)	T Rating (hr.)	F Rating (hr.)
1½	2½	¾	3
4	¾	0	3
6	¾	0	2

4. Forming Material*—Min. 2½" thick mineral wool batts, friction fitted into the opening.

USG Interiors, Inc.—Type SAFING.

5. Fill, Void or Cavity Material*—Min. 2" layer of fill material that is applied with a caulking gun and installed flush with the top surface.

In concrete block wall assemblies, the forming material (item 4) shall be centered in the opening depth and the fill material shall be installed symmetrically.

USG Interiors, Inc.—Type SMOKE SEAL Compound.

*Bearing the UL Classification Marking

Through-penetration firestop system no. 165 is in accordance with UL Standard #1479 and ASTM E814. Tests have shown that the system performs under fire-fighting conditions including a 30 psi pressure hose stream. In the ratings for this system, the F rating is based on (1) preventing flame passage through the system and (2) resistance to the hose stream after fire exposure. The T rating is based on (1) resisting flame passage through the system, (2) preventing individual temperature rise on non-fire side of 325°F above ambient temperatures and (3) resisting the hose stream.

Smoke Chamber Test Smoke inhalation causes 80% of all fire deaths, and 65% of fire deaths occur away from the fire room. These facts indicate that, while building assemblies perform sufficiently well to contain a fire to the room of origin, many are inadequate to contain smoke and fire gases.

One reason that building assemblies provide adequate fire containment performance is that this performance can be evaluated by a test procedure, ASTM E119. But there is no consensus test method to evaluate the ability of fire walls to contain smoke.

Building assemblies with through-penetrations can be evaluated by test procedure ASTM E814, which measures fire containment when utility services pass between units. However, no standard exists to measure the ability to contain smoke to the fire side of through-penetration assemblies.

In 1990, a new smoke containment test was developed at the USG Corporation Research Center at Libertyville, Illinois. This test evaluates the ability of through-penetration and curtain wall details to contain smoke to the fire side of an assembly.

A new airtight smoke containment test chamber was designed to measure the temperature, air volume and pressure sub-

jected to the penetration details. The chamber was fabricated of stainless steel to form a double-layer open-topped box measuring 25"x25"x16" inside and 28"x28"x17½" outside. The space between the two skins was filled with high-temperature insulation. The box was fitted with thermocouples, an electric resistance heater, and piping and measuring devices for air delivery to the chamber. All openings in the shell were sealed with high-temperature sealant. A shelf angle was installed completely around the interior perimeter so that test specimens placed in the box would divide it into upper and lower chambers. Airtight performance of both chambers was tested and verified.

Three details were constructed to test the condition of a pipe passing through a concrete floor fitted with the THERMAFIBER Fire/Smoke-Stop System. Cured, sealed concrete slabs were cored with 2", 4" and 6" diameter holes. The pipe passing through the holes was surrounded by 2" THERMAFIBER safing measured from the base of the concrete slab. 2" SMOKE SEAL compound was applied over the safing and leveled to the top of the slab.

- Test Specimen 1—2" diam. hole passing 1" diam. pipe.

- Test Specimen 2—4" diam. hole passing 2" diam. pipe.
- Test Specimen 3—6" diam. hole passing 2" diam. pipe.

Two details were constructed to test the condition of a curtain wall fitted with THERMAFIBER safing sealed with SMOKE SEAL compound and located a distance from the floor edge. Two cured, sealed concrete slabs were cast, each with a 16"x6" slot. A 16" length of 1" CW 90 foil-faced THERMAFIBER curtain wall insulation was secured along the long edge of the slot.

- Test Specimen 4—Slot was filled with foil-faced THERMAFIBER safing and installed foil-face up. Interfaces between the safing and the slab and curtain wall insulation foil face were both

caulked with SMOKE SEAL compound.

- Test Specimen 5—Slot was filled with unfaced THERMAFIBER safing up to the top 1/2". Top 1/2" was filled with SMOKE SEAL compound.

Result: Overpressures measured in actual fire conditions range from 10 to 40 pascals (0.0015 to 0.0058 psi) above atmospheric pressure. These overpressures would tend to drive the smoke and fire gases from the fire

room to adjoining rooms. Five details were tested in which the overpressures were varied. The following table shows the volume of gas passed

through these fire details per unit time at an overpressure of 40 pascals, the maximum overpressure expected in an actual fire.

Gas Volume Rate at Maximum Fire Pressure

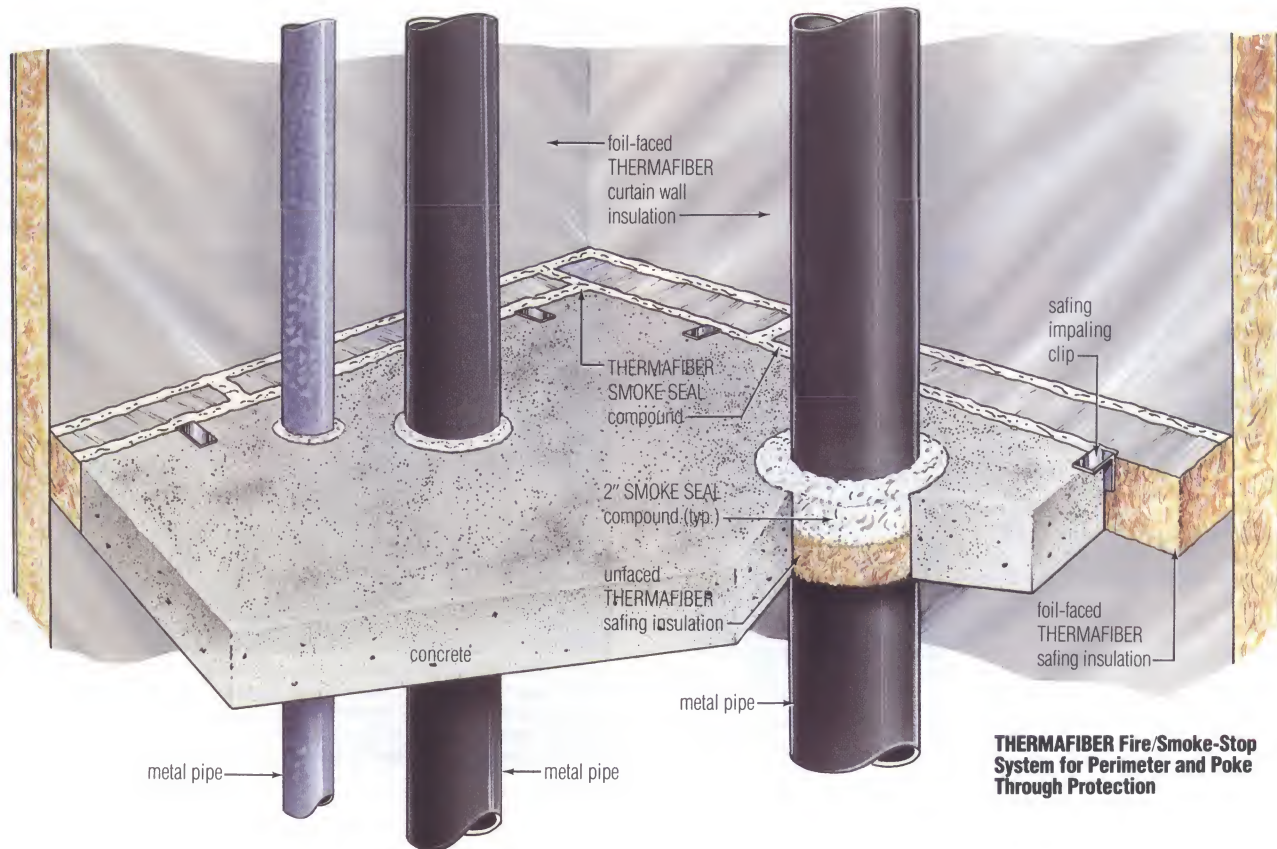
Test Specimen	Gas Volume Rate of Flow (Standard Cubic Feet per Minute)
THERMAFIBER Fire/Smoke-Stop System	
Test Specimen 1 (2" diam. hole/1" diam. pipe)	0.53
Test Specimen 2 (4" diam. hole/2" diam. pipe)	0.58
Test Specimen 3 (6" diam. hole/2" diam. pipe)	0.70
Curtain Wall System	
Test Specimen 4 (Foil-faced safing with SMOKE SEAL around perimeter)	0.43
Test Specimen 5 (Unfaced safing with 1/2" SMOKE SEAL topping)	0.80



Smoke chamber test of curtain wall detail.



Smoke chamber test of THERMAFIBER Fire/Smoke-Stop System.



THERMAFIBER Fire/Smoke-Stop System for Perimeter and Poke Through Protection

THERMAFIBER CURTAIN WALL INSULATIONS

United States Gypsum Company and USG Interiors, Inc. developed fire containing exterior curtain wall systems and continue to be leaders in this field. THERMAFIBER insulation, an integral component in curtain wall systems for more than 20 years, provides fire resistance, sound isolation and thermal performance.

The exterior spandrel component is usually a panel of aluminum, porcelainized steel, structural glass, concrete, marble or granite and backed with insulation for thermal control. To ensure spandrel integrity, *the insulation backing must be a positive fire-stopping material.*

Three distinct THERMAFIBER curtain wall insulation products turn spandrel panels into fire barriers. Designed for quick mechanical attachment, these noncorrosive mineral fiber insulations function equally well in exterior column covers and in window and track fillers. Blankets are available in three different densities: 4 lb./cu. ft.—CW 40; 6 lb./cu. ft.—CW 70; 8 lb./cu. ft.—CW 90.

- **Regular Curtain Wall Insulation** comes as semi-rigid blankets of unfaced felt for backing spandrel panels of opaque material where no vapor retarder is needed.



Regular Curtain Wall Insulation

- **FSP Curtain Wall Insulation** is the same as regular curtain wall insulation with a tough scrim-reinforced foil facing that serves as a vapor retarder. The facing also adds durability for field installation.



FSP Curtain Wall Insulation

- **Dark Curtain Wall Insulation** is similar to regular curtain wall insulation except it has a darker color for backing dark-colored glass spandrel panels. Using dark insulation instead of light insulation improves the look of the

assembly. Because the combined effects of color and shading can be unpredictable, a full-scale mock-up of the insulated spandrel is required to assure desired appearance.



Dark Curtain Wall Insulation

Typical Fire Containment Designs/Tests

Performance Tested In February 1989, USG Interiors tested a curtain wall assembly with an unprotected granite panel to determine whether granite panels need fire protection in curtain wall assemblies.

THERMAFIBER safing insulation was used to safe-off the opening between the floor slab and the granite panel. During the fire exposure, numerous cracks formed in the 3-cm (about 1-in.) thick granite panel, beginning at seven minutes into the test. The cracks went completely



Typical Fire Containment System Fire test (USG #9-29-83) of typical curtain wall spandrel detail (above) demonstrates weakness in combining glass-fiber curtain wall insulation with THERMAFIBER Safing Insulation; the glass-fiber spandrel insulation melted in 10 minutes; the glass spandrel shattered in 21 minutes, 47 seconds. THERMAFIBER Safing Insulation fell out intact.

through the granite, demonstrating that even noncombustible materials like granite require fire protection. Previous tests have shown that THERMAFIBER curtain wall insulation provides this protection and prevents fire from penetrating the curtain wall and spreading to the floor above.

In another curtain wall test, glass spandrel panels were fire tested with glass fiber curtain wall insulation and THERMAFIBER safing insulation. Because of the glass fiber's inability to resist high temperatures, it began to melt at ten minutes and resulted in the glass spandrel panel shattering at 21 minutes, 45 seconds. The THERMAFIBER safing insulation fell out intact (see photos on page 8). This test demonstrated that, in order to be effective, cur-

tain wall assemblies protected with THERMAFIBER safing insulation must also contain THERMAFIBER curtain wall insulation, which can provide protection at temperatures of 2,000°F.

USG Interiors, Inc. has also conducted fire tests to measure the performance of THERMAFIBER curtain wall insulation against glass fiber and polyurethane insulations for protecting aluminum spandrel panels. Fire tested at temperatures up to 2,080°F, the THERMAFIBER insulation effectively resisted the passage of flame. It kept aluminum spandrel panel temperature well below melt point until the test was terminated more than 5 hours later. Other insulation types failed in 26 minutes or less (see table below).

Fire-Containment Time Comparison

Insulation Type	ASTM E119 Test Time ⁽¹⁾
High-melt-point	
THERMAFIBER curtain wall insulation	5 hr. 5 min. ⁽²⁾
Low-melt-point	
Glass fiber (6-pcf dens.)	26 min. ⁽³⁾
Glass fiber (4-pcf dens.)	12 min. ⁽³⁾
Polyurethane (fire-resistant type)	2 min. ⁽³⁾

(1) Time duration of test to point at which panel is breached, allowing passage of flame and hot gases; test controlled in accordance with ASTM E119 time/temperature curve.

(2) Test of 1/8" thick aluminum curtain wall panel with insulation exposed to fire, witnessed by The Consulting Engineers Group Inc., Feb. 18, 1974. No melting or disintegration after 5 hr. 5 min. When temperature reached 2,080°F, the aluminum panel was still intact. However, to avoid furnace damage, the test was terminated.

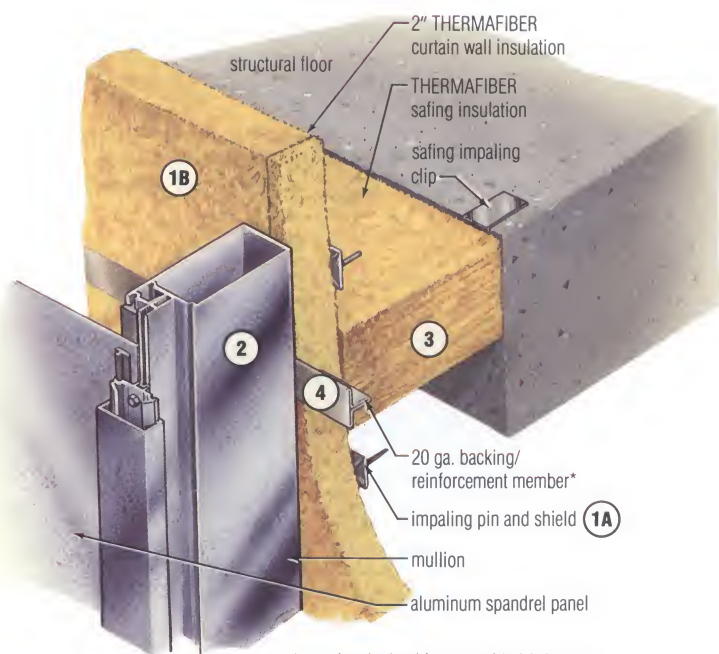
(3) Test of 1/8" curtain wall panel with insulation exposed to fire, witnessed by Wiss, Janney, Elstner Associates, Inc., Oct. 16-20, 1972.

For additional information and details on fire containment tests, see Curtain Wall Insulation folder IW-682.

Curtain Wall Checklist

The following checklist contains important details that must be included in a THERMAFIBER fire containment system.

1. THERMAFIBER curtain wall insulation must be attached using mechanically secured impaling pins, screws, or other positive mechanical attachment method.
2. Curtain wall insulation must protect aluminum mullions from fire.
3. Safing insulation is compression fit (min. 1/2" wider than opening) into safe-off area (2"-8") and supported with safing "Z" clip. When safe-off area is
4. less than 2" wide safing insulation may be friction fit and topped off with 1" layer of SMOKE SEAL compound.
4. A backing/reinforcement member is placed horizontally in back of the curtain wall insulation and is mechanically attached horizontally mullion to mullion to prevent bowing of curtain wall insulation due to pressure applied from compression fit safing insulation. Typical reinforcement members include hat channels, "L" angles and "T" angles, which may be obtained from outside fabricators.



* may be obtained from outside fabricators

TYPICAL FIRE CONTAINMENT DESIGNS / TESTS

Current fire testing procedures are designed to evaluate a specific element (wall, beam or floor-ceiling). However, containing fire at an exterior wall

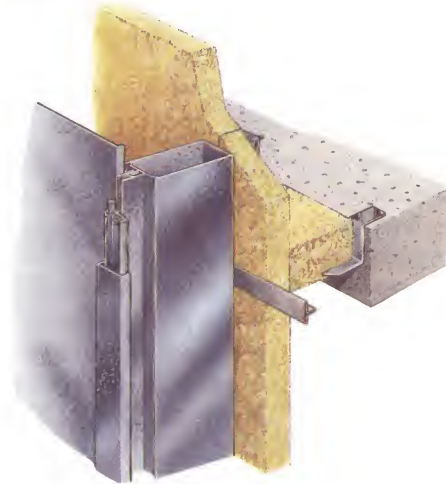
requires fire endurance of the *entire insulating system* protecting both the spandrel and the intersection of the floor at the spandrel. In the absence

of an established fire testing procedure, USG Interiors developed a test to measure the fire containment of a complete curtain wall and safing insulation assembly.

Aluminum Curtain Wall Fire Containment

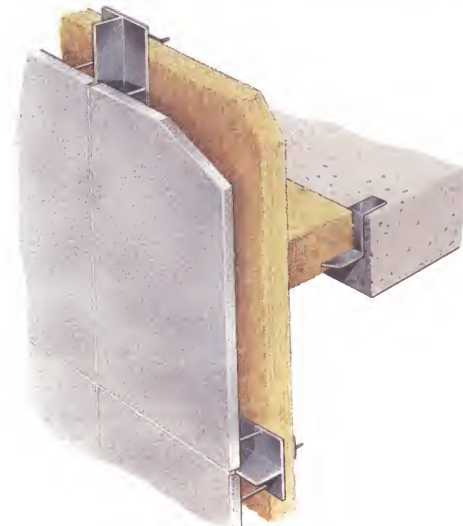
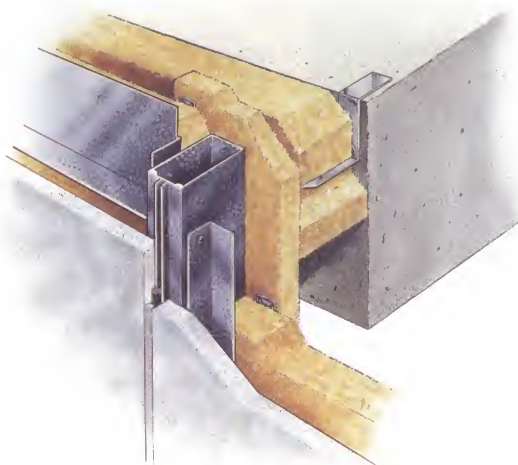
- 5 hr.¹** Aluminum spandrel panel 5'x6'8", 1/8" thick, bolted to alum angle frame—2" CW-90 Curtain Wall Insulation—alum weld-on pins with speed clips approx 12" o.c.—**CEG 3-29-74**
- 2 hr.** Aluminum spandrel panel 4'x6'9", 0.247" thick, bolted to frame—2" CW-40 Foil-Faced Curtain Wall Insulation—8d alum-nail, weld-on pins with speed clips 14" vert, 12" horiz—**USG 10-18-71**
- 2 hr.** Aluminum spandrel panel 5'x6'9", 1/8" thick, bolted to frame—2" CW-90 Curtain Wall Insulation—weld-on pins with speed clips approx. 12" o.c.—**WJE 72455**
- 1 hr.** Exterior aluminum and steel panel 4'5"x6'9" secured in frame—1 1/4" CW-90 Curtain Wall Insulation—impaling pins and speed clips near center and top—**USG 6-3-71**

1. Conducted to establish an end-point for THERMAFIBER insulation in a typical curtain wall assembly, but after 5 hr. 5 min. without failure or physical change (except color), test was terminated to avoid furnace damage.



Granite Curtain Wall Fire Containment

- 3 hr.** Granite spandrel panel, 1 1/16" thick, kerfed top and bottom and inserted in alum extrusions secured to alum mullions at 5' o.c.—recessed 2" CW-90 Foil-Faced Curtain Wall insulation screw attached with sheet metal shields at 12" o.c. to 1 1/2" x 1 1/2" 20 ga. galv steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall Insulation screw attached 12" o.c. 2" safe off area between furnace and assembly was sealed with 4" THERMAFIBER safing compression fit and secured with safing clips modified to 1 1/2" length—**CEG 4-23-90**
- 2 hr.** Granite spandrel panel, 1 1/16" thick, secured to 2 1/2"x2 1/2"x1/4" steel angle frame 3'8"x6'6"—2" CW-90 Foil-Faced Curtain Wall Insulation—weld-on pins with speed clips spaced 12" o.c. around frame—**CEG 10-6-81**
- 2 hr.** Granite spandrel panel, 1 1/16" thick, kerfed top and bottom and inserted in alum extrusions secured to alum mullions at 5' o.c.—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields at 12" o.c. to 1 1/2" x 1 1/2" 20 ga. galv steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe off area between furnace and assembly was sealed with 4" THERMAFIBER safing secured with safing clips—**CEG 1-15-90**
- 1 hr.** Granite spandrel panel, 1 1/16" thick, inserted in alum mullion frame 3'7"x6'8"—horizontal metal furring channel between mullions—2 1/2" CW-40 Curtain Wall Insulation behind channel—5/8" SHEETROCK® brand Gypsum Panels, FIRECODE C Core, applied and screw attached to channel—**CEG 7-27-81**



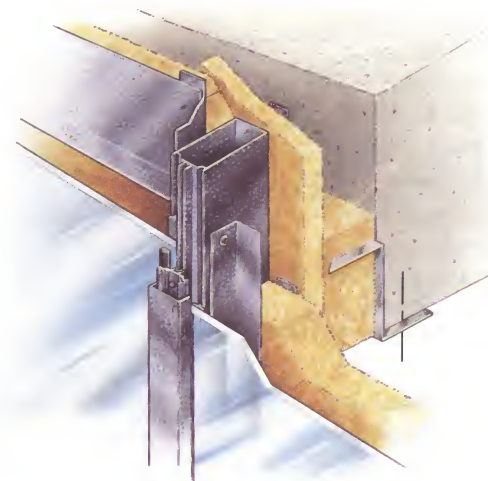
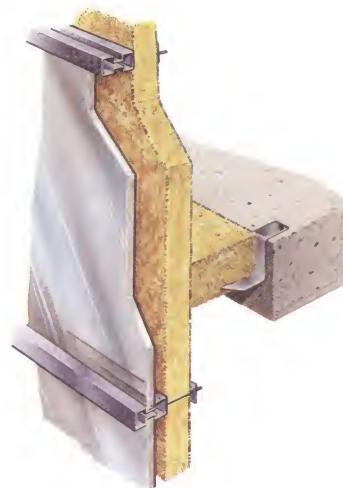
Glass Fiber Reinforced Concrete Curtain Wall Fire Containment

- 2 hr.** GFRC spandrel panels, 6'8¼"x7', ½" thick, framed with 4" steel studs—5" CW-40 Curtain Wall Insulation in cavity—2 layers ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw attached to GFRC studs—**CEG 4-23-82**
- 1½ hr.** GFRC spandrel panels, 6'8¼"x7', ½" thick, framed with 4" steel studs—5" CW-40 Curtain Wall Insulation in cavity—½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw attached to GFRC studs—**CEG 2-3-82**



Glass Curtain Wall Fire Containment

- 3 hr.** Tempered vision-glass spandrel panel, 3'2"x6'2½", ¼" thick, in alum frame—2" CW-90 Dark Curtain Wall Insulation—impaled on pins secured with shields at top and bottom—**CEG 4-2-81**
- 2 hr.** Tempered glass spandrel panel, 4'8"x5'9", ¼" thick, in alum frame—2" CW-90 Foil-Faced Curtain Wall Insulation—impaled on pins secured with shields—**WJE-72481**
- 2 hr.** Tempered glass spandrel panel, ¾" thick, secured to alum mullions at 5' o.c. with pressure plates—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields 12" o.c. to ⅝" x 1¼" x 1¼" alum angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe off area between furnace and assembly was sealed with 4" THERMAFIBER safing secured with safing clips and mechanically attached to underside of floor slab.¹—**CEG 12-20-89**
- 2 hr.** Tempered glass spandrel panel, ¾" thick, secured to alum mullions at 5' o.c. with pressure plates—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields 12" o.c. to ⅝" x 1¼" x 1¼" alum angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe off area between furnace and assembly was sealed with 4" thick THERMAFIBER safing topped off with 1" THERMAFIBER SMOKE SEAL compound in lieu of safing clips²—**CEG 1-16-90**
- 1 hr.** Heat-strengthened black glass spandrel panel 3'3"x5'9", ¼" thick, in alum mullion frame—2" CW-90 Foil-Faced Curtain Wall Insulation inserted in mullions—support clips at floor slab—**CEG 8-6-81**
- 1 hr.** Tempered solar gray glass panel 5'1¼"x6'10", ¼" thick, set in alum mullion frame—2"x4'x5' CW-90 Curtain Wall Insulation—impaled on wire clips secured with shields 24" o.c.—**CEG 7-25-85**



1. Safing was installed from underside of floor slab using safing clip mechanically attached to underside of floor slab.
2. Because safe off area was less than 2", safing insulation was friction fit and topped off with 1" of SMOKE SEAL compound in lieu of safing clips.

Note: Technical art and text describe the test assembly in general.

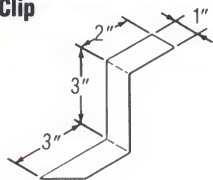
THERMAFIBER SAFING INSULATION

THERMAFIBER safing insulation fills the void between slab edge and curtain wall insulation to contain fire. Foil-faced insulation impedes the passage of smoke and noxious gases. THERMAFIBER safing insulation also is the principal fire-resistant material used to fill poke-through openings. (See Fire/Smoke-Stop System page 5.)

THERMAFIBER safing insulation system components include 4" thick by 24" wide blankets of insulation and specially designed safing impaling clips. Blankets are field cut and installed with safing clips or wire support brackets. Strips of insulation must be cut min. 1/2" wider than the opening to assure a compression fit.

When safing is installed between the floor slab and curtain wall insulation which spans from mullion to mullion, a supplementary backing/reinforcement member must be installed to prevent compression force of safing insulation from bowing curtain wall insulation.

THERMAFIBER Safing Impaling Clip



Performance Tested In addition to extensive fire testing, THERMAFIBER safing insulation has also been tested for sound attenuation. An assembly was constructed to simulate a 6" thick concrete floor with a 6" opening between the slab and the exterior wall.

The opening was filled with 4" thick, 4-lb./cu. ft. density THERMAFIBER safing insulation covered top and bottom with steel plates. This assembly produced a rating of STC

49, outperforming an assembly where the opening was filled with 2-lb./sq. ft. lead. Filling the space with concrete produced an assembly rating of STC 54.

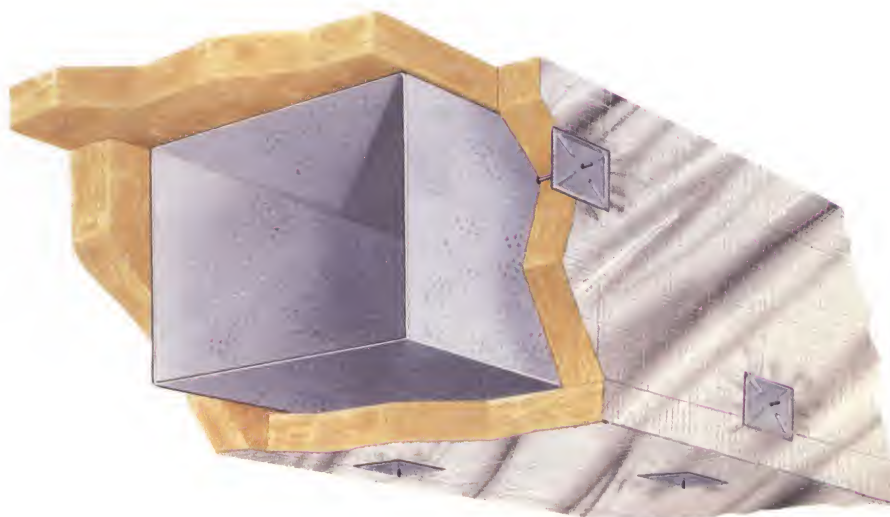


THERMAFIBER safing insulation is cut wider than the opening to assure compression fit. Installs easily with wire support brackets or safing clips. Available with foil backing to impede smoke and noxious gases.

THERMAFIBER MINERAL FIBER FIREPROOFING FOR KITCHEN DUCTS

THERMAFIBER kitchen duct fireproofing protects buildings against fires that occur in kitchen grease ducts. The semi-rigid batt comes 2 1/2" thick, 8-lb./cu. ft. density, and is faced with aluminum foil. The THERMAFIBER kitchen duct fireproofing is applied around the 16 ga. steel duct, impaled on mechanically attached pins and secured with sheet metal shields.

Tested in accordance with Section 64.67(6) of the State of Wisconsin Code (CEG Report 9-12-77), assembly provides a 2-hr. rating.



THERMAFIBER MINERAL FIBER STRUCTURAL FIREPROOFING

Fire can weaken structural steel framing in high-rise buildings. THERMAFIBER mineral structural fireproofing is a semi-rigid, asbestos-free felt that is noncorrosive to steel and aluminum and insulates structural framing from the heat of fire. Ease of installation and minimal clean-up make it far superior to spray-on fireproofing materials.

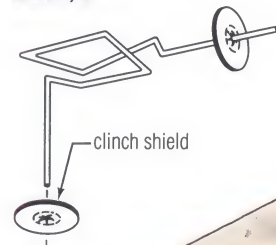
Fireproofing Details

Beam Fireproofing
3-hr. D301
UL Design

Eight UL designs are available with fire ratings as follows: 4-hr.—No. X304; 3-hr.—Nos. X306, N304, D301; 2-hr.—Nos. X305, N305, N304, D915, D302.

12-ga. Snap-on Flange Clip

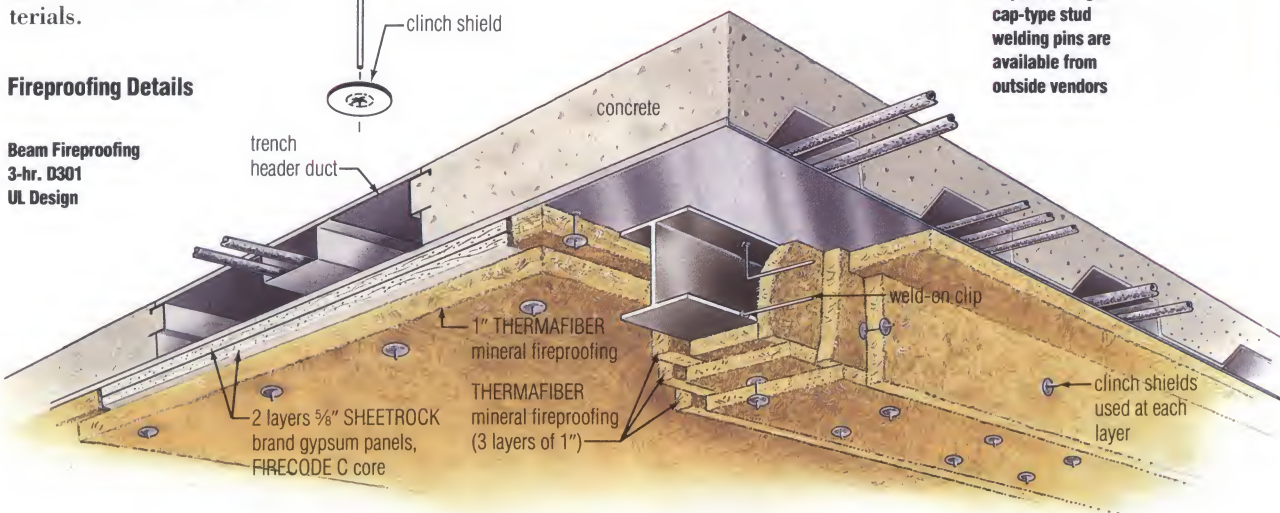
available from
Wabash, IN



To estimate protection required for different size steel structural members, consult American Iron and Steel Institute (AISI) brochure "Designing Fire Protection for Steel Columns." AISI is headquartered in Washington, D.C.



12-ga. weld-on clips and 10-ga. cap-type stud welding pins are available from outside vendors



Fire Ratings & UL Designs

Fire Rating	Description	UL Design No.††	Column or Beam Size
4 hr.	Mineral Fireproofing—single-layer 2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X304	W14 x228
3 hr.	Mineral Fireproofing—double-layer 2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X306	W10 x49
3 hr.†	Mineral Fireproofing—double-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units—additional pieces of mineral fireproofing stuffed between crests of fluted deck and beam.	N304	W8 x24
3 hr.‡	Mineral Fireproofing—single-layer 1 1/2" thick under floor deck and trench header with double-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, under trench header—triple-layer 1 1/2" thick mineral fireproofing around beam—fireproofing and panels attached with stud welding pins and clinch shields—2 1/2" concrete on fluted steel floor units.	D301	W6 x12
2 hr.	Mineral Fireproofing—single-layer 2 1/2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X305	W10 x49
2 hr.	Mineral Fireproofing—double-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 16" o.c. max.—3 1/4" concrete on fluted steel floor units.†	D915	W8 x13
2 hr.	Mineral Fireproofing—single-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units—additional pieces of mineral fireproofing stuffed between crests of fluted deck and beam.	N305	W8 x24
2 hr.**	Mineral Fireproofing—single-layer 1" thick under floor deck and trench header with double-layer 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, under trench header—triple-layer 1" thick mineral fireproofing around beam—fireproofing and panels attached with stud welding pins and clinch shields—2 1/2" concrete on fluted steel floor units.	D302	W6 x12
1 1/2 hr.	Mineral Fireproofing—single-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units.	N304	W8 x24

†Restrained beam rating; unrestrained beam rating is 2 hr. ‡Beam rating 4 hr. **Beam rating 3 hr.

††Design prefix designates columns (X), Beams (N), Floors (D)

THERMAFIBER SOUND AND THERMAL CONTROL INSULATIONS

Sound Attenuation Fire Blankets THERMAFIBER sound attenuation fire blankets (SAFB) are effective barriers to sound transmission for improved privacy and productivity in the workplace. They are particularly useful in partitions requiring fire ratings and as overlayment for ceilings to improve acoustics.

Depending on the particular assembly and application, partition STC ratings have been improved up to nine points by installing THERMAFIBER SAFB in the stud cavity. The insulation also has been shown to improve MTC ratings for low-frequency sound attenuation, isolating sounds from machinery, mechanical equipment and music.

Drywall partitions with THERMAFIBER SAFB consistently outperform insulations with lower densities. In fact, tests conducted at Riverbank Acoustical Laboratories found that partitions with THERMAFIBER SAFB (2.5 lb/cu. ft.) provided STC ratings up to 4 points higher than partitions with ½ to 1 inch thicker glass fiber insulation (0.7-0.8 lb/cu. ft.). The added density is particularly important for isolating speech and music.

THERMAFIBER SAFB are superior to glass fiber in sound attenuation. In fact, low-density glass fiber insulation must be nearly twice as thick as standard THERMAFIBER SAFB to provide the same attenuation.

Typical THERMAFIBER SAFB Sound-Barrier Assemblies

Drywall Partitions	STC Rating
Steel Stud—Multi-Layer Panels	59 to 62
Steel Stud—Double Layer Panels	53 to 61
Steel Stud—Single Layer Panels	45 to 55
Wood Stud—Double Layer Panels	53 to 59
Wood Stud—Single Layer Panels	45 to 54
Relocatable	42 to 50
Area Separation Wall	47 to 60
Cavity Shaft Wall	39 to 51

Drywall Ceilings

Steel Bar Joist—Single Layer Panels	54
Steel Joist—Resilient Single Layer Panels	58
Steel Joist—Resilient Double Layer Panels	61
Wood Joist—Single Layer Panels	41
Wood Joist—Resilient Panels	52

Veneer Plaster Partitions

Steel Stud—Multi-Layer Base	59 to 62
Steel Stud—Double Layer Base	49 to 53
Steel Stud—Single Layer Base	45
Wood Stud—Resilient Base	49 to 53

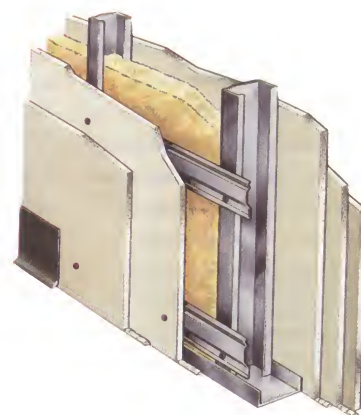
Standard Plaster Partitions

Steel Stud—Gypsum Lath	49
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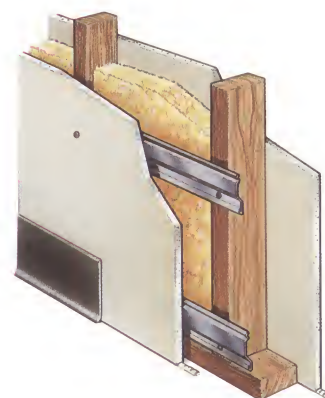
High Performance Drywall Partitions	STC	MTC
Double Walls	69	62
Steel Stud—Resilient Panels	65	61

High Performance Floor/Ceiling Assemblies	STC	MTC
Wood Joist-Resilient Double Layer Panels	58-60	53-54

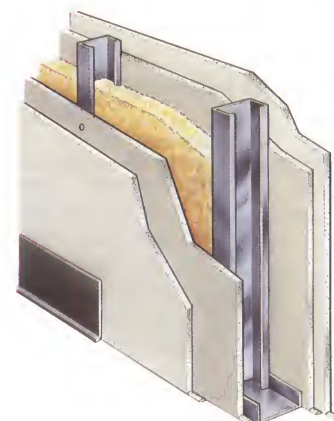
THERMAFIBER 3" SAFB with 2 layers resilient attached drywall one side, 3 layers direct attached drywall other side.
Sound test TL-87-153: 61 STC, 56 MTC.
UL Design U-455: 3-hour rating.



THERMAFIBER 3" SAFB with 1 layer resilient attached drywall one side, 1 layer direct attached drywall other side.
Sound test BBN-760903: 50 STC.
UL Design U-311: 1-hour rating.



THERMAFIBER 1½" SAFB with 2 layers direct attached drywall both sides.
Sound test SA-800421: 55 STC.
UL Design U-412: 1-hour rating.



THERMAFIBER 3" SAFB with 2 layers resilient attached drywall on ceiling side, gypsum Type F pumped flooring, carpet and pad on floor side.
Sound test TL-90-40: 59 STC, 54 MTC.
UL Design I-541: 2-hour rating.



Creased THERMAFIBER SAFB

Creased THERMAFIBER SAFB offer the most economical drywall sound systems in the 50 to 55 STC range. These fire-rated systems are ideal for party and corridor walls in hotels, motels, offices, and multi-family dwellings.

The creased THERMAFIBER SAFB system is a patented insulation blanket assembly that is 1" wider than regular blankets. After the blanket is installed in the partition cavity, a 1" vertical slit is field-cut partially through the center of the blanket, allowing it to be creased. Compressing the extra width into the stud cavity buckles the center, exerting pressure against both studs and drywall. This pressure dampens sound vibrations and boosts the partition's STC rating.

For example, a single-layer drywall partition with Creased THERMAFIBER SAFB has the same STC rating as an unbalanced drywall partition with standard SAFB.

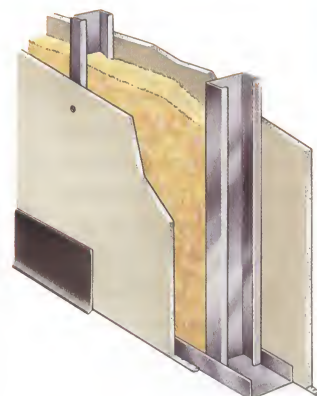
As shown in the details, Creased THERMAFIBER insulation can be installed either in systems with gypsum panels attached directly to studs or in systems with resilient channel attachments. After screw attachment of SHEETROCK brand gypsum panels, joints are finished with a United States Gypsum Company joint treatment system and the partition perimeter is caulked with SHEETROCK acoustical sealant.

Sound ratings of Creased THERMAFIBER systems meet design requirements for speech privacy. Direct attachment systems achieve 51 STC (TL-85-128, Riverbank Laboratories). Resilient attachment systems achieve 55 STC (SA-850415, Shiner & Associates). Combined with veneer plaster systems from United States Gypsum Company, direct attachment Creased THERMAFIBER systems are rated 50 STC (SA-860620, Shiner & Associates), and resilient attachment systems are rated 55 STC (SA-850635, Shiner & Associates).

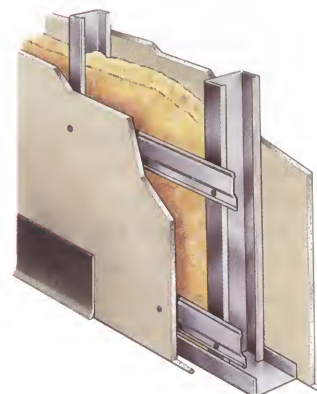
Single-layer construction means low in-place cost and reduced weight. Creased THERMAFIBER single-layer assemblies save material and labor compared to unbalanced gypsum drywall partitions having equivalent sound isolation. Creased SAFB assemblies also reduce dead load and save floor area.

Constructed of noncombustible components, the direct attachment Creased THERMAFIBER system has achieved 1-hour fire ratings (reference UL Design U-465 for vertically applied panels; GA-WP-1200 for system with horizontally applied panels). UL Design U-465 supplies a 1-hour fire rating for the resilient system. For more complete information, request *Creased THERMAFIBER Systems*, publication IW-783.

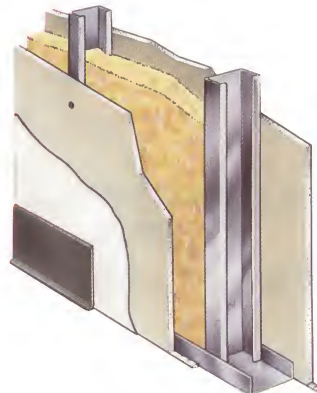
THERMAFIBER 3" Creased SAFB with 1 layer direct attached drywall on each side.
Sound test TL-85-128: 51 STC.
UL Design U-465: 1-hour rating.



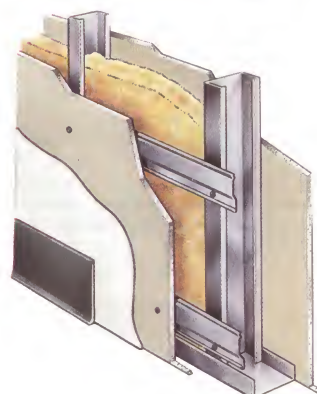
THERMAFIBER 3" Creased SAFB with 1 layer resilient attached drywall one side, 1 layer direct attached drywall other side.
Sound test SA-850415: 55 STC.
UL Design U-451: 1-hour rating.



THERMAFIBER 3" Creased SAFB with 1 layer direct attached gypsum base and veneer finish both sides.
Sound test SA-860620: 50 STC.
UL Design U-465: 1-hour rating.



THERMAFIBER 3" Creased SAFB with 1 layer resilient attached gypsum base and veneer finish one side, 1 layer direct attached gypsum base and veneer finish other side.
Sound test SA-860635: 55 STC.
UL Design U-451: 1-hour rating.



For further information about plaster and drywall partition systems construction for sound control, consult United States Gypsum Company publications SA-919 and SA-920 in Sweet's General Building and Renovation File.

FS-15 AND FS-25 BLANKETS

- **THERMAFIBER FS-15 Commercial Blankets**, when installed in exterior load-bearing walls, reduce heat transmission, saving energy and improving occupant comfort. They are ideal for commercial wood- and steel-stud assemblies and exterior Z-furring. Flame spread rating is 15, smoke developed 0.
- **THERMAFIBER FS-25 Commercial Blankets** provide thermal and sound control properties and are also foil-faced with an FSP vapor retarder. They are intended for most exposed-insulation and vapor-control situations such as floor/ceilings, walls or crawl spaces. Flame spread rating is 25, smoke developed 5.



PRODUCT DATA AND INSULATING VALUE INFORMATION

Sizes & Shipping Points

Product Designation	Birmingham, Ala.				Wabash, Ind.				Tacoma, Wash.				Corsicana, Tex.			
	Min. Thick.	Max. Thick.	Standard Sizes		Min. Thick.	Max. Thick.	Standard Sizes		Min. Thick.	Max. Thick.	Standard Sizes		Min. Thick.	Max. Thick.	Standard Sizes	
			Width ⁽²⁾	Lgth. ⁽²⁾			Width ⁽²⁾	Lgth. ⁽²⁾			Width	Lgth.			Width	Lgth.
CW 40 ⁽¹⁾	2"	6"	24"	36" 48" 60"	2"	6"	24"	36" 48" 60"	2"	4"	24"	48"	2"	5"	24"	45"
CW 70 ⁽¹⁾	1½"	5"	24"	36" 48" 60"	1½"	6"	24"	36" 48" 60"	1½"	2½"	24"	48"	1½"	3"	24"	45"
CW 90 ⁽¹⁾	1"	4"	24"	36" 48" 60"	1"	5"	24"	36" 48" 60"	1"	2"	24"	48"	1"	2½"	24"	45"
Safing ⁽¹⁾	4"	4"	24"	48"	4"	4"	24"	48" & 60"	4"	4"	24"	48"	4"	4"	24"	45"
SMOKE SEAL Compound	30 oz. cartridge, 3½ & 5 gal. pails				30 oz. cartridge, 3½ & 5 gal. pails				30 oz. cartridge, 3½ & 5 gal. pails				30 oz. cartridge, 3½ & 5 gal. pails			
Mineral Fireproofing	1"	4"	24"	48"	1"	4"	24"	48" & 60"	—	—	—	—	2"	2"	24"	45"
Kitchen Duct Fireproofing	2½"	2½"	24"	48"	2½"	2½"	24"	48"	—	—	—	—	2½"	2½"	24"	45"
SAFB	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"
FS-15	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"
FS-25	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"

NOTE: Dimension tolerances—width ± ⅛", length — ¼" + ¾", thickness — ⅛", + ¼" (Tacoma products — ⅛", + ⅜").

(1) Aluminum-foil facing, available from all plants; also dark curtain wall insulation, available from Wabash or Birmingham plants.

(2) Consult sales representative for additional sizes. SAFB density 1" = 4 lb., all others = 2.5 lb.

Thermal Resistance Values* (R = I/C)
For use in calculating heat transmission coefficients (u)

Insulation Values

Blanket Thickness	Product & R Value		
	SAFB	FS-25 (Foil Faced)	FS-15 (Unfaced)
6"	22	22	22
5 1/4"	19	19	19
3 1/2"	13	13	13
3"	11	11	11
2"	7.41	N/A	7.41
1 1/2"	5.6	N/A	5.6
1"	4	N/A	4

*Based on listings in ASHRAE Handbook of Fundamentals (1985).

Material Values

2 5/8" insulating sheathing	2.06	asphalt shingle roofing	0.44
1/2" insulating sheathing	1.32	1/2" gypsum panels	0.45
1/2" gypsum sheathing	0.45	3/8" plaster base	0.32
1" extruded polystyrene insulation ⁽¹⁾	5.00	1/2" sanded plaster	0.09
1/2" plywood	0.62	1/2" plaster with it.	0.32
3/4" plywood	0.93	wt. aggregate	0.20
1/4" hardboard	0.34	portland cement with aggregate (per in.)	0.80
3/4" softwood (pine)	0.94	4" common brick	0.44
3/4" hardwood	0.68	8" face brick	1.85
1" x 8" wood drop siding	0.79	8" clay tile	1.11
3/4" x 10" beveled wood siding	1.05	8" concrete block with sand aggregate	0.06
exterior stucco (1" thick)	0.20	vapor-permeable felt	negl.
3/8" built-up roofing	0.33	vapor retarder plastic film	2.08
wood shingle roofing	0.94	carpet and fiber pad	0.05
		floor tile—asphalt, vinyl	

(1) Thermal resistance for extruded polystyrene insulation at 40°F mean temperature is 5.4; data based on certified test.

Air Space Values

	Type of Surface	
	Non-Reflective	Reflective
Heat flow up		
1/2" space	0.75	1.57
3/4" space	0.77	1.66
3 1/2" space	0.84	2.01
Heat flow down		
1/2" space	0.91	2.54
3/4" space	1.02	3.52
3 1/2" space	1.22	8.17
Heat flow horizontal		
1/2" space	0.90	2.46
3/4" space	0.94	2.77
3 1/2" space	0.91	2.55

Based on 50°F mean temperature and 30°F temperature differential.

Air Surface Values

	Type of Surface	
	Non-Reflective	Reflective
Inside, heat flow up (still air)	0.61	1.32
Inside, heat flow down (still air)	0.92	4.55
Inside, heat flow horizontal (still air)	0.68	1.70
Outside, (15 mph wind)	0.17	—
Outside, (7.5 mph wind)	0.25	—

Thermal Conductivity (according to ASTM C518)

Product Designation	"k" @ 75°F. btu • in./ hr. • sq. ft. • °F.	For insulation only															
		1" thick		1 1/2" thick		2" thick		2 1/2" thick		3" thick		3 1/2" thick		4" thick		5 1/4" thick	
		R ⁽²⁾	U ⁽³⁾	R	U	R	U	R	U	R	U	R	U	R	U	R	U
CW 40	0.25 ⁽¹⁾	—	—	—	—	8.0	0.13	10.0	.1	12.0	.083	14.0	.071	16.0	.062	—	—
CW 70	0.24 ⁽¹⁾	—	—	6.2	0.16	8.3	0.12	10.4	.095	12.5	.080	14.6	.068	16.6	.060	—	—
CW 90	0.23 ⁽¹⁾	4.3	0.23	6.5	0.15	8.7	0.11	10.9	.091	13.0	.076	15.2	.066	17.4	.057	—	—
Safing	0.25	—	—	—	—	—	—	—	—	—	—	—	—	16.0	—	—	—
Mineral Fireproofing	0.23	4.3	—	6.5	—	8.7	—	10.9	—	—	—	—	—	—	—	—	—
1" SAFB	0.25	4.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All other SAFB	0.27	—	—	5.6	—	7.4	—	9.3	—	11.1	—	13.0	—	14.8	—	19.4	—
1" FS-15	0.25	4.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All other FS-15	0.27	—	—	5.6	—	7.4	—	9.3	—	11.1	—	13.0	—	14.8	—	19.4	—
FS-25	0.27	—	—	—	—	—	—	—	—	11.1	—	13.0	—	14.8	—	19.4	—

(1) Applies to both standard color and dark curtain wall insulation.

(2) R = thickness ÷ K.

(3) U value shown is for insulation only. However, in practice U values represent the overall heat transmission of all components in an assembly (U = 1 ÷ Total R).

Fire Resistance Rated
noncombustible as defined by
NFPA Standard 220 when tested
according to ASTM E136.

Surface Burning Characteristics
(according to ASTM E84)

Product Designation	Flame Spread	Smoke Developed
CW Regular (unfaced) ⁽¹⁾	15	0
CW Foil-Faced ⁽¹⁾	25	5
Safing Regular (unfaced)	15	0
Safing Foil-Faced	25	5
Mineral Fireproofing (unfaced)	15	0
Mineral Fireproofing Foil-Faced	25	5
Kitchen Duct Fireproofing Foil-Faced	25	5
FS-15 Blankets	15	0
FS-25 Blankets	25	5
SAFB	15	0
SMOKE SEAL Compound	5	0

All products have a class A interior finish rating per NFPA 101, life safety code.

(1) Applies to both standard color and dark curtain wall insulation.

Product Density

Product Designation	Nom. Density —pcf	Approximate Density Tolerance —pcf ⁽²⁾			Application Method
		Corsicana Tacoma	Birmingham Wabash	Min. Thick.	
CW 40 ⁽¹⁾	4.0	± 0.5	−5 + 1.0	2"	see tests for req'd. attachment
CW 70 ⁽¹⁾	6.0	± 0.75	−0.75 + 2.0	1 1/2"	
CW 90 ⁽¹⁾	8.0	± 1.0	−1.0 + 2.0	1"	
Safing	4.0	± 0.5	−0.5 + 1.0	4"	brackets or safing clips
Mineral Fireproofing	9.0	± 1.5	−1.5 + 2.0	2", 2 1/2"	snap-on wire clips or weld-on studs
1" SAFB	4.0	± 0.5	−0.5 + 1.0	1"	friction fit between studs
All other SAFB	2.5	± 0.5	−0.5 + 1.0	1 1/2"	friction fit between studs
1" FS-15	4.0	± 0.5	−0.5 + 1.0	1"	friction fit between studs
All other FS-15	2.5	± 0.5	−0.5 + 1.0	1 1/2"	friction fit between studs
FS-25	2.5	± 0.5	−0.5 + 1.0	3"	friction fit between studs

(1) Applies to both standard color and dark curtain wall insulation.

(2) On package weight basis.

SPECIFICATION COMPLIANCE

Products meet:

ASTM C665

Federal Specification HH-I-521F—

- Curtain Wall Insulation as Types I and III (.02 perm, tested in accordance with ASTM E96 procedure)
- Safing Insulation as Type I
- Mineral Fireproofing as Type I
- SAFB Blankets as Type I
- FS-15 Blankets as Type I
- FS-25 Blankets as Type III, Class A

ASTM C612

Federal Specification HH-I-558B—

- Curtain Wall Insulation (all) as Classes 1 and 2 (.02 perm, tested in accordance with ASTM E96 procedure)
- Curtain Wall Insulation (CW 70, CW 90) as Classes 3 and 4 (.02 perm, tested in accordance with ASTM E96 procedure)
- Safing Insulation as Classes 1 and 2
- Mineral Fireproofing as Classes 1, 2, 3 and 4

ASTM E814

UL Standard 1479

- Safing Insulation used in conjunction with SMOKE SEAL Compound.

ASTM C553

- THERMAFIBER Insulations adsorb less than 1% moisture by weight and volume.

Products are approved by:

New York City Board of Standards & Appeals

- Curtain Wall Insulation, .02 perm, tested in accordance with ASTM E96 procedure (under BSA 214-73-SM & accepted by MEA-209-82)

- Safing Insulation (619-48-SM & 39-74-SM)
- Mineral Fireproofing (under BSA 619-48-SM & accepted by MEA: 70-71-M [4-hr. col.], 28-75-M [3-hr. col.], 25-74-M [2-hr. col.], 24-74-M & 138-75-M [beams]).

State of Wisconsin Code

- Kitchen Duct Fireproofing (Section 64.67[6])

GOOD DESIGN PRACTICES

1 Vapor Retarders—In areas where high humidity and temperatures predominate, consideration should be given to placing the vapor retarder on warm or outside of wall to prevent moisture condensation within the insulation.

2 Ceilings—Insulation should be carefully fitted around—not over—recessed light fixtures. Covering fixtures with insulation causes heat to build up, which could possibly result in fire.

3 Glass Spandrels—Minimum 1" air space is required between glass spandrels and insulation behind them.

4 Exterior Walls—Penetrations in exterior walls for windows, doors, outlets, HVAC, etc. must be sealed with sealant or tape. Foil tape also should be used in foil-faced curtain wall applications to close joints and repair damaged areas. Mechanical attachment of safing and curtain wall insulation is required to avoid dislodging because of air movement, particularly in furred exterior walls without sheathing or backing.

5 Test Data—USG Interiors, Inc. will provide certified test data for published fire, sound and structural systems designed and constructed according to its published specifications. Tests are conducted on curtain wall assemblies fire-protected with these products to meet performance requirements specified by various agencies. *System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

ARCHITECTURAL SPECIFICATIONS

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be supplied by *USG Interiors, Inc. or United States Gypsum Company* (THERMAFIBER sound attenuation fire blankets) and shall be installed according to current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Design Conditions

THERMAFIBER (curtain wall) (safing) (Fire/Smoke-Stop System) (mineral fireproofing) (sound attenuation fire blanket) (FS-15) (FS-25) Insulation shall be (1) (2) (3) (4) (5)-hr. fire-tested under simulated field conditions using ASTM E119 guidelines.

Part 2: Products

2.1 Life-Safety Insulation

2.1.1 Curtain Wall

THERMAFIBER mineral fiber curtain wall insulation, (CW-40)(CW-70)(CW-90), () thick, () wide, () long, type ([regular] [dark] color, unfaced, non-vapor retarding) (FSP, scrim-poly reinforced foil-facing vapor retarder).

2.1.2 Safing

THERMAFIBER mineral fiber safing insulation, regular color, (unfaced) (vapor retarding foil-faced) with galvanized steel safing clips.

2.1.3 Sealing Compound

THERMAFIBER SMOKE SEAL compound, smoke-resistant, in (30-oz. cartridges) ([3½] [5]-gal. pails).

2.2 Fireproofing Insulation

2.2.1 Structural

THERMAFIBER mineral fiber fireproofing, 8-lb/ft³ density, (unfaced) (foil-faced), (1) (2) (2½) inches thick, 24" wide by (48) (60) inches long.

2.2.2 Kitchen Duct

THERMAFIBER mineral fiber fireproofing, 8-lb/ft³ density, (foil-faced), 2½" thick, 24" wide by 48" long.

2.3 Sound Insulation

THERMAFIBER sound attenuation fire blankets, (1) (1½) (2) (2½) (3) inches thick, (16) (24) (25) inches wide, 48" long, unfaced.

2.4 Thermal Insulation

THERMAFIBER commercial blankets, (1) (1½) (2) (3) (3½) (5¼) (6) inches thick, (15) (16) (23) (24) inches wide, () long, Type (FS-15, unfaced) (FS-25, faced).

Part 3: Execution

3.1 Curtain Wall Insulation Application

Mechanically attach CW insulation to inside of spandrel panels with fasteners approved by the architect.

3.2 Safing Insulation Application

Install THERMAFIBER safing insulation (of proper size, 2"-8" max opening, in safe-off area foil side up between THERMAFIBER curtain wall insulation and floor slabs), on safing clips spaced as needed, 24" o.c. max. (3 clips per 4' batt), leaving no voids. Cut safing wider (½" min.) than opening to insure compression fit. Compress or install on wire hangers in all floor slab openings, to seal completely around telephone cables, ducts, piping or other utilities.

3.3 Fire-Resistant Sealant Application

Seal all joints with ¾" bead of THERMAFIBER SMOKE SEAL compound. Top off safing insulation in all poke-through openings with minimum 2" depth of THERMAFIBER SMOKE SEAL compound.

3.4 Sound Attenuation Fire Blanket Application

Install THERMAFIBER sound attenuation fire blankets in stud cavities of sound-rated partitions and where required to achieve fire-rated design. Friction fit securely between studs. Butt ends of blankets closely together and fill all voids.

3.5 Ceiling Overlayment Application

Install THERMAFIBER sound attenuation fire blankets over ceiling panels (1½" single or double layer over entire ceiling) (3" over entire ceiling) extending 48" beyond all partitions and tightly fit around all grillage, hangers and other vertical penetrations.

3.6 FS-15 Application

Position THERMAFIBER FS-15 commercial blanket vertically against wall surface. Hold in place with a Z-furring channel according to directions. Position next blanket so that it abuts attached furring member, and hold in place with next furring channel.

3.7 FS-25 Application

Install THERMAFIBER FS-25 commercial blankets in stud cavities where specified. Friction fit securely between studs. Install insulation between floor joists and support blankets with wire mesh, woven tie-wire or flexible metal rods. Butt ends of blankets closely together and fill all voids. For poke-through penetrations, install THERMAFIBER safing insulation in opening.

For further information on these products, including nonstandard sizes, contact
USG Interiors, Inc., Dept 346,
101 South Wacker Drive, Chicago, IL
60606-4385

Sales Offices:

Alabama
Birmingham
(205) 849-0274

Indiana
Wabash
(219) 563-6833

Texas
Corsicana
(214) 872-3936

Washington
Tacoma
(206) 627-0379

Information on THERMAFIBER SAFB
Commercial Blankets is also available
from **United States Gypsum Company**

Sales Offices:

Arizona
Phoenix
(602) 866-0795

California
Fremont
(415) 792-4400
Glendale
(818) 956-1882

Florida
Jacksonville
(904) 764-3293
Miami
(305) 557-4501

Georgia
Atlanta
(404) 393-0770

Hawaii
Honolulu
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(312) 606-4130

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Indianapolis
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Louisiana
New Orleans
(504) 241-2020

Maryland
Baltimore
(301) 355-2200

Massachusetts
Charlestown
(617) 241-8530

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Southfield
(313) 569-1900

Minnesota
Bloomington
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Missouri
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(713) 666-0751

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(801) 266-4975

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U.S. Gypsum Company
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Glendale
(818) 956-1882

Georgia
Atlanta
(404) 393-0770

Illinois
Chicago
(312) 606-5475

New York
Tarrytown
(914) 322-8000

For health and safety information see
Material Safety Data Sheet (MSDS)
and *Health and Safety Aspects of*
Man-made Fiber available from USG
Interiors, Inc. and United States
Gypsum Company representatives and
offices.

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office or representative for
information.

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application of these goods not in
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instructions or for other than the
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limited to replacement of defective
goods. Any claim shall be deemed
waived unless made in writing to us
within thirty (30) days from date it was
or reasonably should have been
discovered.

USG Interiors, Inc.
Thermafiber Division
101 South Wacker Drive
Chicago, Illinois
60606-4385

SA-707/1-91
Printed in U.S.A.

SA-904

DONN[®]

Ceiling

Suspension

Systems

USG Interiors, Inc.



USG

STANDARD COLOR CEILING SUSPENSION SYSTEMS



Canyon (067)



Desert Rose (091)



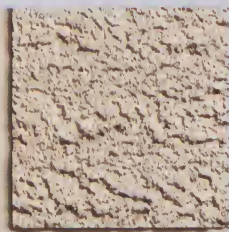
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Beige (142)



Sunset (100)



Mist (053)



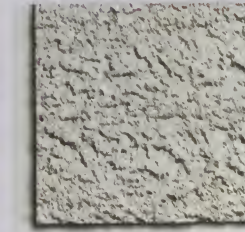
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Dusk (191)



Parchment (103)



Willow (073)



Aquamarine (081)



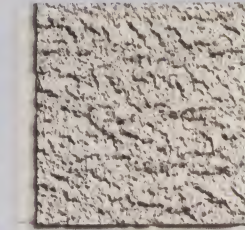
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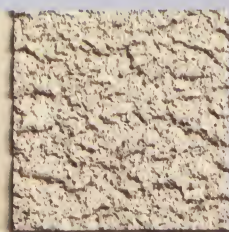
Sandstone (090)



Alabaster (104)



Silvertone (052)



Manila (246)



Fawn (181)



Melon (646)



Straw (143)



Carmel (144)*



Ice Blue (093)



Cranberry (099)*



Brownstone (075)*



Black (005)*

CONTRASTING FINISHES FOR SUSPENSION SYSTEMS

Eight contrasting finishes (not shown) are available as standard products. For swatches of these finishes, refer to

the Up with Color Selector, SC-937, or contact your USG Interiors representative.

Brass (065)
Bronze (033)
Chrome (066)
Silver Satin (002)
Tierra Brown (092)

*Deeptones. See Price List

Woodgrain (034)
White (004)
Flat White (050)

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DONN SUSPENSION SYSTEMS FROM USG INTERIORS, INC. Precision engineering, modern styling and color correctness. Offering quality without compromise, the DONN line of suspension products is the most complete selection of suspension systems available in the commercial building industry.

All DONN suspension systems are designed for esthetics, strength, and fast, easy installation. In addition to visual appeal, these systems provide special features such as automatic panel centering and plug-in positive lock insertion, which save time and money.

USG Interiors is one of the world's largest commercial interior construction products companies, and the undisputed leader in ceiling suspension systems. Continuing a tradition of superior products, systems and customer service, USG Interiors brings imagination to interior designs with exciting alternatives for ceilings, walls and floors.

Color Options: USG Interiors, Inc. features the broadest line of colors in the industry. Twenty-four standard colors are available on DX, CENTRICITEE, FINELINE and MERIDIAN suspension systems. For design integrity, the same 24 standard colors are available on panels and tile from USG Interiors, Inc. If a contrasting suspension system is desired, woodgrain, metallic and other finishes are also standard. To meet precise specifications, designer colors can be custom matched to coordinate with special interior fabric, carpet and wall treatments.

Color samples to meet project needs are free upon request. Call 1-800-USG-7272 toll-free for immediate service. In Minnesota call 218-879-2800.

Color Uniformity: Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings is considered well within normally accepted commercial tolerance.

In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton).

These color reproductions show colors that are as close as possible within printing limitations to actual products. For a more representative match to actual production material, see product samples offered by your USG Interiors sales representative.

Cover Photo: CENTRICITEE Suspension system in Manila, new Quick-Trim in Manila.

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INTERSECTIONS

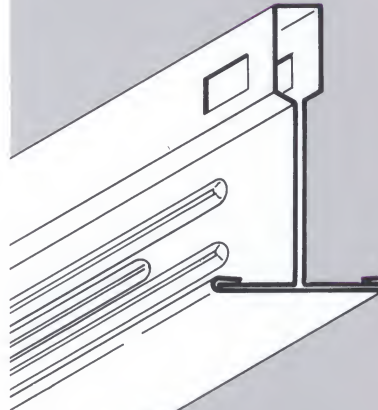
INTERSECTIONS This inventive, completely original system dramatically combines 24" x 24" and 5" x 5" modules using a single grid element. Installed at an 11½° angle to the perimeter of the space, the INTERSECTIONS system provides a unique look that cannot be achieved by any other ceiling system.

- Exciting options for the 5" x 5" squares: recessed incandescent light fixtures; accent acoustical panels, accent speaker and sprinkler inserts⁽¹⁾
- INTERSECTIONS perimeter can be finished with conventional wall molding or floated with INTERSECTIONS island trim
- DX profile
- Available in Flat White and 5 designer colors: Manila, Silvertone, Parchment, Taupe, Mist
- Connections meet or exceed seismic requirements for tension and compression
- System meets heavy duty load requirements⁽²⁾
- INTERSECTIONS air diffuser
- Extremely strong, rigid system

(1) Speakers and sprinklers supplied by others.

(2) When installed per instructions with 49" hanger spacing.

Item No.	Face	Length	Height
ITX29	15/16"	29"	1½"

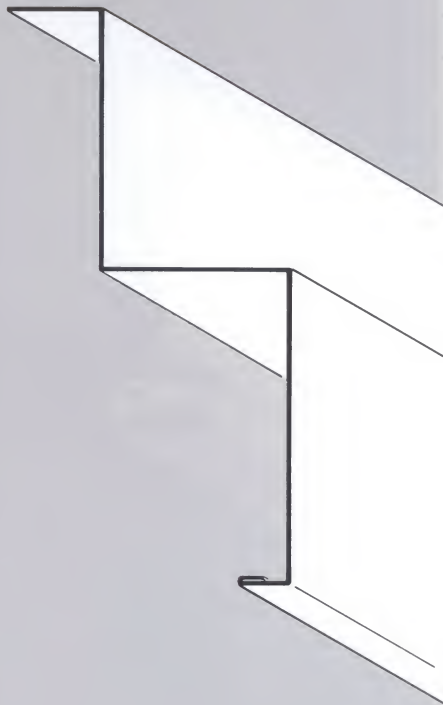


INTERSECTIONS suspension system in White. **INTERSECTIONS** air diffuser assemblies and recessed lighting integrate with **INTERSECTIONS** system for a clean uninterrupted ceiling plane.

INTERSECTIONS Island Trim

INTERSECTIONS Island Trim This trim is designed specifically for the INTERSECTIONS ceiling system.

- Preserves the floating edge perimeter of the INTERSECTIONS ceiling system while giving a mitered, finished edge to frame the ceiling
- Factory engineered for tailored appearance and precise fit
- Snap-on installation



**INTERSECTIONS
Island Trim**



Geometrix

MERIDIAN

Geometrix

- Designed specifically for Geometrix screen-printed ceiling panels
- Finished look of Geometrix ceiling system is captivating, contemporary, unconventional
- Focused grid lines blend with pattern details on panel—resulting in an exceptionally finely crafted appearance for an exposed grid and panel system
- Slender $\frac{1}{8}$ " reveal, mitered corners for a clean, finished look
- Fast assembly—proven DX cross tee clip provides plug-in positive-lock installation without tools
- Snap-on Quick-Trim frames island ceilings, giving a finished, tailored appearance and precise fit
- Accepts Geometrix panels and other USG Interiors ceiling panels with the special Geometrix edge design

Item No.	Class	Length	Height	Tested Load (lbs./LF)
				4' Hanger Spacing
Main Tee				
GTX 28	Intermediate	12'	1 ²³ / ₃₂ "	12.0

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
GTX 228	2'	1 $\frac{23}{32}$ "	55.0
GTX 428N	4'	1 $\frac{23}{32}$ "	12.0

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

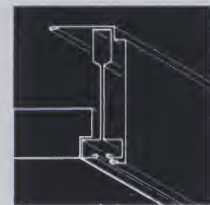
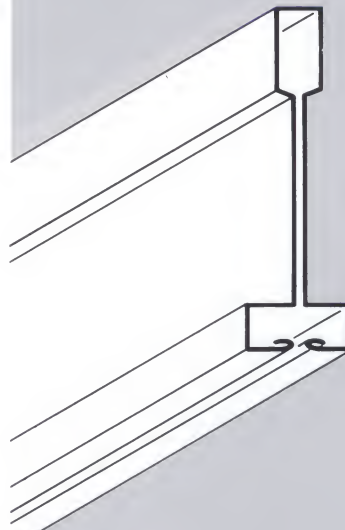
MERIDIAN Combines the esthetics of more expensive screw-slot grid with the function and utility of exposed grid. Its unique, rounded $\frac{5}{32}$ " reveal softens the effect of grid lines to enhance the finished look.

- Automatic centering of panels and light fixtures
- Pull-out tension values in excess of 300 pounds
- Plug-in positive-lock insertion for quick installation without tools
- Available in 24 colors

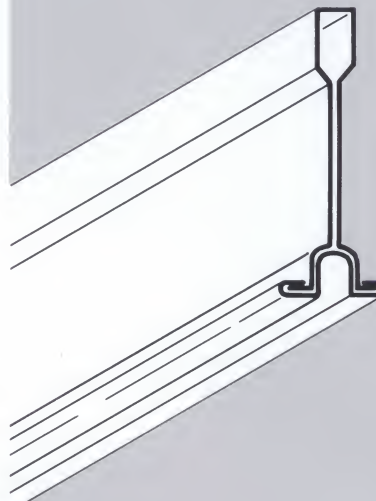
Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXM 24	Intermediate	12'	1½"	12.1	6.2

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
DXM 224	2'	1 $\frac{1}{2}$ "	50.4
DXM 424	4'	1 $\frac{1}{2}$ "	8.2
DXM 524	5'	1 $\frac{1}{2}$ "	4.3

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

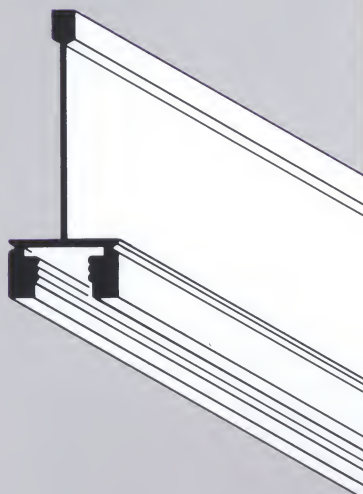
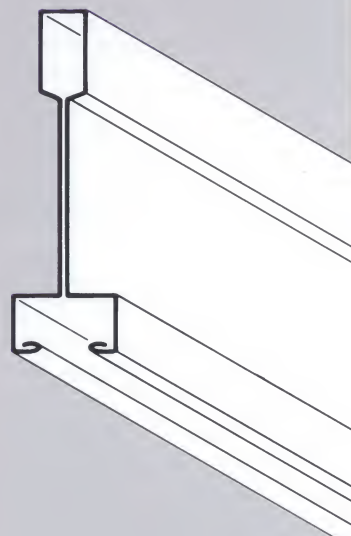


Quick-Trim Island Ceiling/Geometrix Grid.





Quick-Trim Island
Ceiling/FINELINE
Grid.



FINELINE

Highline

FINELINE An innovative, narrow-profile, slotted ceiling grid. Its mitered intersections offer a clean, tailored appearance.

- Available with a white or black reveal for hiding or accentuating grid lines
- DONN brand air diffuser assemblies integrate with grid and panels for a clean, uninterrupted ceiling plane
- Cost savings from fast assembly
- Choice of module sizes
- Available in 24 colors
- Proven DX cross tee clip provides plug-in positive-lock installation without tools, and 300 lb. tension values
- Fire-rated assemblies available
- Snap-on Quick-Trim frames island ceilings, giving a finished, tailored appearance and precise fit

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXF 29	Intermediate	12'	1 ²⁵ / ₃₂ "	12.3	6.6	3.6
DXFH 29	Heavy Duty	12'	1 ²⁵ / ₃₂ "	16.7	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXF 229		2'	1 ²⁵ / ₃₂ "	59.8		
DXF 429N		4'	1 ²⁵ / ₃₂ "	12.4		
DXF 529N		5'	1 ²⁵ / ₃₂ "	6.9		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Highline A narrow-faced extruded aluminum screw-slot grid with an added dimension of style and crisp edge detail.

- Smooth, medium, and heavy textures available, including the option of a contrasting black reveal
- Provides an uninterrupted reveal for a trim, finished appearance
- For complete product availability information, refer to the current Acoustical Suspension System Parts Guide, or contact your USG Interiors representative

Item No.	Class	Length	Height
Main Tee			
HIC/HCC 3012N24	Intermediate	12'	1 ⁷ / ₈ "
HIC/HCC 3612N24	Heavy Duty	12'	2 ¹ / ₄ "
Item No.		Length	Height
Cross Tee			
HIC/HCC 2424		2'	1 ¹ / ₂ "
HIC/HCC 4830		4'	1 ⁷ / ₈ "
HIC/HCC 4830N		4'	1 ⁷ / ₈ "

CENTRICITEE

CENTRICITEE The first 2-hour fire-rated $\frac{1}{16}$ " grid. Presents a subtle, narrow-line alternative to $\frac{15}{16}$ " exposed grid.

- Patented, automatic panel-centering devices built into each grid member
- Meets or exceeds all national code requirements, including seismic
- Fire-rated assemblies available
- Available in 24 colors
- Snap-on Quick-Trim frames island ceilings, giving a finished tailored appearance and precise fit

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXT 24	Intermediate	12'	1½"	12.2	6.6

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
DXT 218	2'	1 $\frac{1}{8}$ "	25.7
DXT 418	4'	1 $\frac{1}{8}$ "	5.0
DXT 424	4'	1 $\frac{1}{2}$ "	12.4
DXT 524	5'	1 $\frac{1}{2}$ "	6.3

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



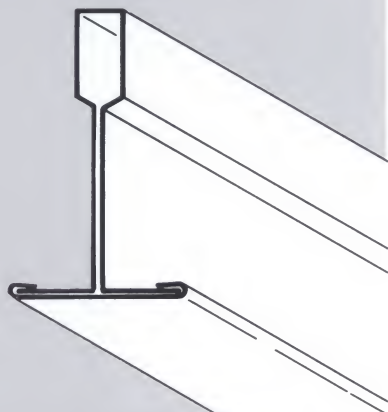
Quick-Trim Island Ceiling/CENTRICITEE Grid.



CENTRICITEE suspension in Parchment color.

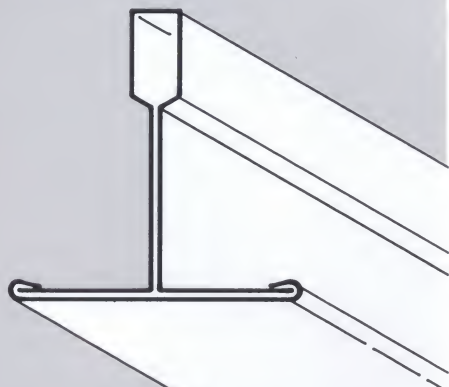
DX, DXL, DXLA The DX system is the most widely used acoustical suspension system. It offers maximum economy, design simplicity and access in an exposed grid system.

- **DX:** Class A $1\frac{5}{16}$ " standard grid. Double web design with high tensile steel connection clips on cross tee ends
- Plug-in positive-lock insertion for quick installation without tools
- Pull-out tension values in excess of 300 pounds without additional wires, clips or fasteners
- Meets or exceeds all national code requirements, including seismic
- Available in 24 colors
- **DXL:** Fire-rated $1\frac{5}{16}$ " system with more than 60 UL Designs up to 3 hours, with all the standard DX advantages
- Available in 24 colors
- **DXLA:** Fire-rated $1\frac{5}{16}$ " system with steel body and corrosion-resistant aluminum cap
- Available in 24 colors
- Snap-on Quick-Trim frames island ceilings, giving a finished, tailored appearance and precise fit



DXW The DXW system offers a $1\frac{1}{2}$ " wide exposed face plus all the features of $1\frac{5}{16}$ " DX grid.

- Available in 24 colors.



DX, DXL, DXLA

DXW

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DX 24	Intermediate	12'	1½"	12.4	6.1	3.6
DX 26	Heavy Duty	12'	1½"	16.3	7.3	4.9

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
DX 216	2'	1"	16.5
DX 316	3'	1"	10.1
DX 416	4'	1"	5.0
DX 422	4'	1½"	8.2
DX 522	5'	1½"	4.3
DX 424	4'	1½"	13.7
DX 524	5'	1½"	6.4

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

For DXL/DXLA load data, see technical data offered by your USG Interiors representative.



Quick-Trim Island Ceiling/DX Grid.

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				3' Hanger Spacing	4' Hanger Spacing	5' Hanger Spacing
Main Tee						
DXW 24	Heavy Duty	12'	1½"	16.3	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXW 224		2'	1"	65.0		
DXW 424		4'	1"	13.7		
DXW 524		5'	1"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

ZXA, ZXLA**AX**

ZXA, ZXLA Double-web galvanized steel body with stainless steel DX clips and painted aluminum cap for complete corrosion resistance.

- Ideal for high humidity areas
- Strength exceeds comparable all-aluminum systems
- Cross tees with offset ends resist sagging or twisting, for a professionally finished appearance
- Plug-in positive-lock insertion for quick installation without tools

Fire-rated ZXLA is accepted in all DXLA designs.

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Spacing	5' Spacing	6' Spacing
Main Tee						
ZXA/ ZXLA 24	Intermediate	12'	1½"	12.4	6.1	9.6

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
ZXA/ZXLA 224	2'	1½"	35.0
ZXA/ZXLA 424	4'	1½"	13.7
ZXA/ZXLA 524	5'	1½"	6.4

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

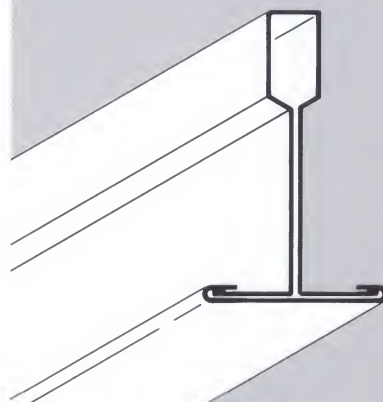
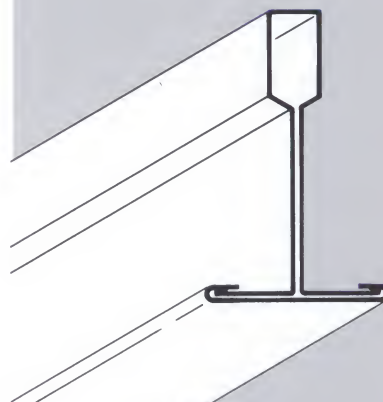
AX Double-webbed all-aluminum grid with stainless steel DX clips.

- Noncorrosive, easy-to-handle system for high humidity areas
- Cross tees with offset ends resist sagging or twisting, for a professionally finished appearance
- Plug-in positive-lock insertion for quick installation without tools

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				3' Spacing	4' Spacing
Main Tee					
AX 26	Light Duty	12'	1½"	16.0	6.9

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
AX 224	2'	1½"	22.8
AX 424	4'	1½"	5.2

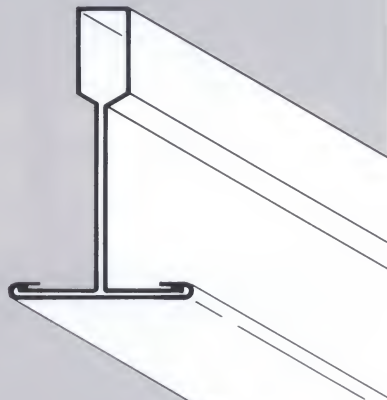
Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



CONCEALED SUSPENSION SYSTEM

DX Concealed Grid The DX Concealed Grid system allows supporting grid to be completely concealed, resulting in a monolithic, uninterrupted ceiling plane.

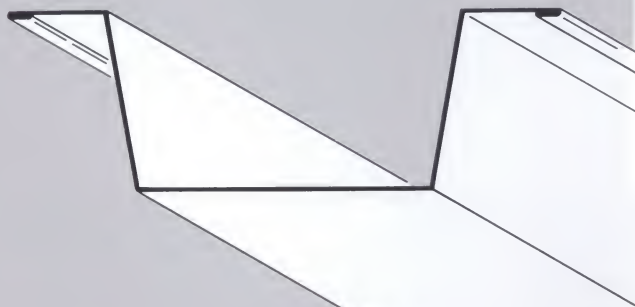
- Concealed systems are available to accommodate a variety of upward or downward access requirements
- Light fixtures, air diffusers, and plenum access points can be arranged with great flexibility
- Fire-rated assemblies available



DRYWALL SUSPENSION SYSTEM

Rigid X This grid is the ideal solution for screw-attaching drywall to a direct hung suspension.

- Combines the installation speed of grid and the durability of black iron furring channel systems into one unique system
- Accepts standard lay-in light fixtures and air diffusers
- Many fire-rated designs
- Quickly installed with modular components
- Knurled face on furring cross channels and furring cross tees for faster screw installation
- Accepts U.S. Gypsum Company SHEETROCK® brand gypsum panels



DX Concealed Grid

Item No.	Length	Height	Tested Load (lbs./LF)
Tee Splines			
DE 208	2'	1/2"	3.4
DT 316	3'	1"	10.0
DT 416	4'	1"	5.0
DEN 416	4'	1"	3.0

Item No.	Length	Height	Tested Load (lbs./LF)
BPA 216	2'	1"	20.0
BPA 316	3'	1"	6.0
BPA 416	4'	1"	4.5
BPA 224	2'	1 1/2"	35.0
BPA 324	3'	1 1/2"	16.0
BPA 424	4'	1 1/2"	6.0
BPA 524	5'	1 1/2"	3.5
FCC/FCZ	2'	3/4"	5.5

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

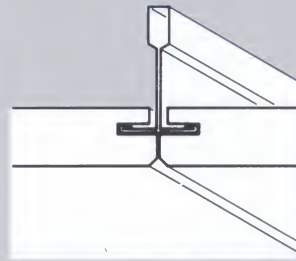
Rigid X

Item No.	Class	Length	Height	Tested Load (lbs./LF) ¹ 4' Hanger Spacing
RMX 12	Heavy Duty	12'	1 1/2"	17.0
Max. Allowable Load				
RCX 4	Cross Channel	4'	7/8"	7.4 lbs. ²
DXLG 424		4'	1 1/2"	13.7 lbs.
DXL 424		4'	1 1/2"	13.7 lbs.

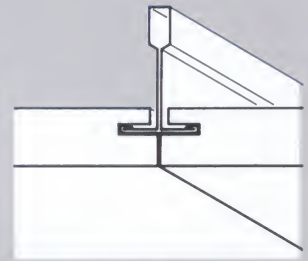
¹ Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

² Calculated based on moment of inertia $I_{xx} = .0112 \text{ in.}^4$

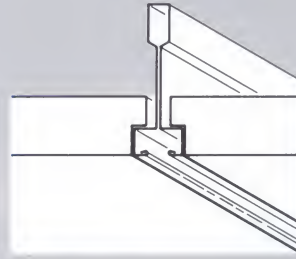
This Selection Chart illustrates compatible ceiling suspension grids and panel edges.



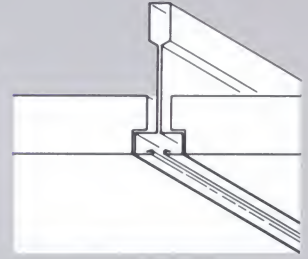
Bevel Edge Tile
DX Concealed Grid



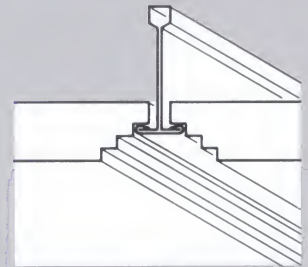
Square Edge Tile
DX Concealed Grid



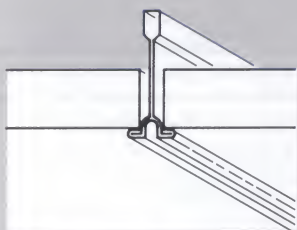
Finline Panel
Finline Grid



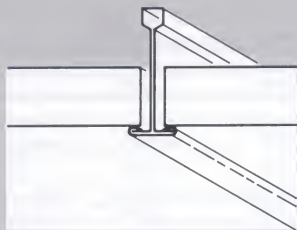
Geometrix Panel
Geometrix Grid



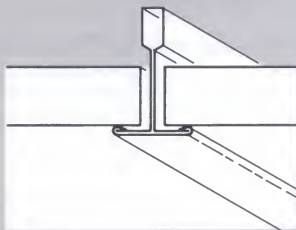
Pedestals Panel
Centricitee Grid



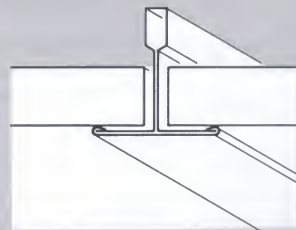
**Square Edge Panel
Meridian Grid**



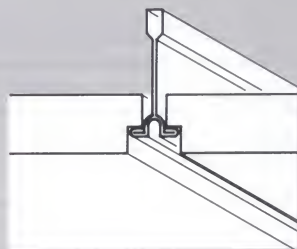
**Square Edge Panel
Centricitee Grid**



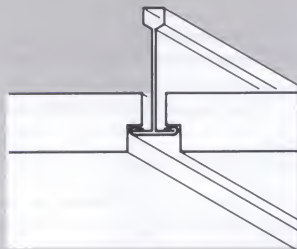
**Square Edge Panel
DX Grid**



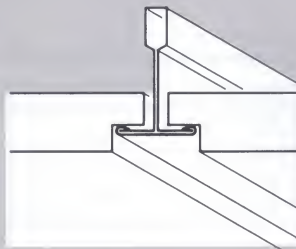
**Square Edge Panel
DXW Grid**



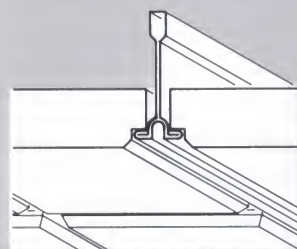
**Finline Panel
Meridian Grid**



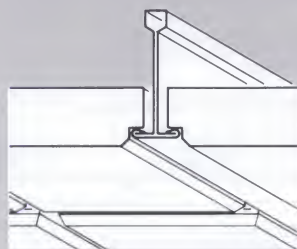
**Finline Panel
Centricitee Grid**



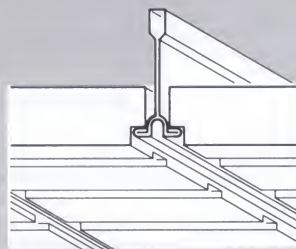
**Shadowline Panel
DX Grid**



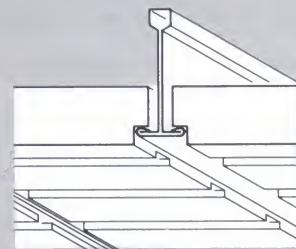
**Chex/16 Panel
Meridian Grid**



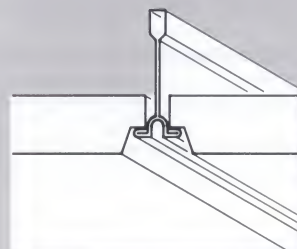
**Chex/16 Panel
Centricitee Grid**



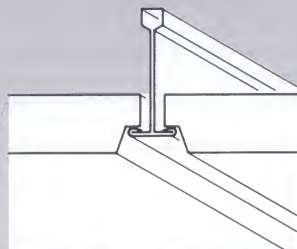
**Checkmate Panel
Meridian Grid**



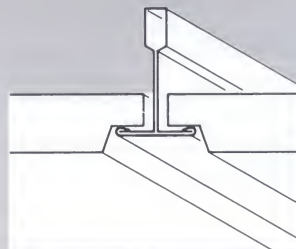
**Checkmate Panel
Centricitee Grid**



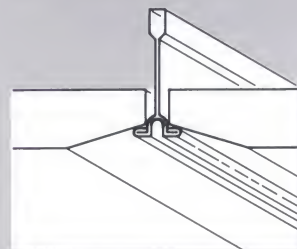
**Interline Tapered Panel
Meridian Grid**



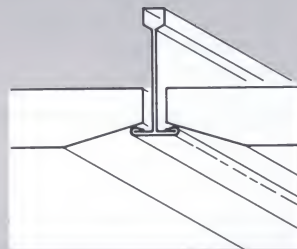
**Interline Tapered Panel
Centricitee Grid**



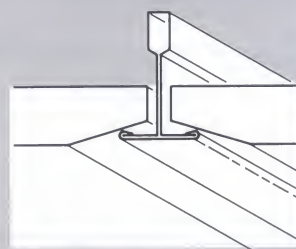
**Shadowline Tapered Panel
DX Grid**



**Prisms Panel
Meridian Grid**



**Prisms Panel
Centricitee Grid**



**Prisms Panel
DX Grid**

From the Fire Resistance Index of Underwriters' Laboratories, Inc., Resistance Classification (Fire), Floor or Roof, Ceiling Constructions and Beam Protection.

Donn DXL/DXLA Fire-Rated Systems UL Design Numbers*

Hour Rating & UL Number	Module Size	Panel Thickness	Panel Mfr.	% Fixtures Per 100 sq. ft.	Air Openings in. ² /100 sq. ft.	Concrete Thickness
Concrete on Full Cellular Deck						
2 hr.; D-215	24" x 48"	5/8"	USG Interiors	16%	113	2 1/2"
Concrete on Metal Lath						
2 hr.; G-204	24", 30" x 60" 24" x 24", 48", 36"	5/8"	USG Interiors	24% 2' x 2', 2' x 4', 20" x 60"	576	2 1/2"
2 hr. & 3 hr.; G-211	24" x 24" x 48"	5/8", 3/4"	USG Interiors	16%	113	2 1/2" (2 hr.) 3" (3 hr.)
2 hr. & 3 hr.; G-213	24" x 48"	5/8", 7/8"	USG Interiors	24%	576 (2 hr.) 154 (3 hr.)	2 1/2" (2 hr.) 3 1/2" (3 hr.)
2 hr.; G-222 (Heavy-Duty)	24" x 24"	1/2"	USG Interiors	12%	57	2 1/2"
2 hr.; G-231	24" x 24" to 30" x 60"	5/8", 3/4"	USG Interiors	16%	57	2 1/2"
1 1/2 hr.; G-259 (Heavy-Duty)	24" x 48"	1/2"	USG Interiors	16%	57	2 1/2"
1 hr.; G-201	24" x 24", 48"	5/8"	USG Interiors	8%	—	2"
Concrete on Ribbed or Corrugated Deck						
2 hr. & 3 hr.; G-211	24" x 24", 48"	5/8", 3/4"	USG Interiors	16%	113	2 1/2" (2 hr.) 3" (3 hr.)
2 hr. & 3 hr.; G-213	24" x 48"	5/8", 7/8"	USG Interiors	24%	576 (2 hr.) 154 (3 hr.)	2 1/2" (2 hr.) 3 1/2" (3 hr.)
2 hr. & 3 hr.; A-207	24" x 48"	5/8", 3/4"	USG Interiors	16%	113	2 1/2"
Wood Joist—2" x 10"						
1 hr.; L-206	24" x 24", 48"	5/8", 3/4"	USG Interiors	8%	110	**
Mineral Fiber on Fluted Steel Deck						
1 hr.; P-214	24" x 24", 48"	5/8", 3/4"	USG Interiors	16%	57	**
1 hr.; P-230	24" x 24", 48" or 20" x 60"	5/8", 3/4"	USG Interiors	24%	255	—
1 hr.; P-238	24" x 24", 48"	5/8"	USG Interiors	16%/24%	576	**
Foam Insulation on Fluted Steel Deck						
1 hr.; P-255	24" x 24", 48"	5/8", 3/4"	USG Interiors	24%	57	2" min.

CENTRICITEE DXLT Fire-Rated Assemblies

Concrete on Corrugated Steel Deck						
1 1/2 hr.; G-262	24" x 24"	5/8"	USG Interiors	24%	113	2 1/2"
Concrete on Metal Lath						
2 hr.; G-265	24" x 24"	5/8", 3/4"	USG Interiors	24%	113	2 1/2"

FINELINE DXLF Fire-Rated Assemblies

1 1/2 hr.; G-264	24" x 24"	5/8"	USG Interiors	24%	113	2 1/2"
1 hr. (Restrained) & 3/4 hr. (Unrestrained) P-254	24" x 24"	3/4"	USG Interiors	24%	113	N/A

RIGID X Fire-Rated Assemblies

Hour Rating & UL Number	Board Thickness	Board Manufacturer	% Fixtures Per 100 sq. ft.	Air Openings in. ² /100 sq. ft.	Concrete Thickness
Concrete on Metal Lath					
2 hr. & 3 hr.; G-523	1/2", 5/8"	U.S. Gypsum (Type C)	24%	144	2 1/2" (2 hr.) 3" (3 hr.)
2 hr.; G-526	1/2", 5/8"	U.S. Gypsum (Type C)	25%	56.5	2 1/2"
2 hr. & 3 hr.; G-529	1/2", 5/8"	U.S. Gypsum (Type C)	24%	57	2 1/2" (2 hr.) 3 1/2" (3 hr.)
1 1/2 hr.; G-528	1/2", 5/8"	U.S. Gypsum (Type C)	—	—	2 1/2"
Precast Concrete					
2 hr. & 3 hr.; J-502	5/8"	U.S. Gypsum (Type C)	—	—	2" (2 hr.) 2 3/4" (3 hr.)
Wood Joists—2" x 10"					
1 hr.; L-525	1/2", 5/8"	U.S. Gypsum (Type C)	24%	57	**
Plywood with Wood Truss					
1 hr.; L-529	5/8"	U.S. Gypsum (Type C)	24%	57	**
Gypsum Concrete					
1 hr. & 1 1/2 hr.; P-507	5/8"	U.S. Gypsum (Type C)	24%	57	**
Gypsum Plank, Insulation Board					
1 1/2 hr.; P-506	5/8"	U.S. Gypsum (Type C)	24%	57	**
Corrugated Steel Deck with Insulated Board or Foam Plastic Insulation					
1 hr.; P-510 & 1 1/2 hr.; P-510	1/2" 5/8"	U.S. Gypsum (Type C)	24%	57	**

*General Notes:

- Hanger wire should be located between the main tee splice and the expansion relief notch and a maximum 48" o.c., or per the requirements of the specific UL design.
- All 60" cross tees are to have hanger wires at their midpoint.
- Assemblies are tested with the method and criteria established in Standard UL 263, also known as A2.1, ASTM E-119 and NFPA 251.
- Hold down clips are required when the fire-rated board used weighs less than 1.0 lb./ft.²
- % Fixtures column indicates 24" x 48" fixture only, unless noted. Check for suspension requirements.
- Some designs pertain for DXL only. Contact UL Fire Resistance Directory and revisions to confirm all information listed in these tables.
- DXLR and ZXLA are also listed by UL.
- DXL has been used in many other industry fire tests and listed in reports such as the National Evaluation Reports, for example, NER-148 and NER-399 (wood truss constructions).

**Check UL Designs for deck options.

Limitations

Special Environmental Requirements

For panels in exposed grids in non-fire rated high-humidity applications, use aluminum or ZXA suspension systems. For fire-rated application, use ZXLA. For exterior applications, suspension system should be approved by manufacturer for outdoor use.

Additional DXL Fire-Rated Assemblies

- 3 hr.: G-229
 2 hr.: A-202, D-208, G-208, G-209, G-218, G-229, G-236, G-243, G-258
 [Concealed systems D-010, G-022]
 1 1/2 hr.: A-210, G-229, G-241, G-243, L-208, P-225, P-227, P-231
 1 hr.: G-241, L-209, L-212, P-210, P-225, P-227, P-244, P-245, P-509, P-513
 3/4 hr.: P-204

Additional RIGID X Fire-Rated Assemblies

- 1 1/2 hr.: P-513
 1 hr.: L-502, L-506, P-509

L.A. Research Report Compliance

DONN suspension systems manufactured by USG Interiors, Inc. comply with one or more of the following L.A. Research Report numbers: 22179, 23541, 24095.

- 1 Fire-Rating**—UL fire-rated designs require: (1) FIRECODE formulation products, (2) fire-rated suspension, (3) entire ceiling installation as specified in UL Design, (4) ceiling free of overlaid material not specified in the design.
- 2 Critical Lighting**—Do not suspend Square edge or smooth-surfaced tile in concealed systems for ceilings subjected to strong sidelighting. Strong sidelighting with a slight angle of incidence to ceiling surface greatly

exaggerates surface irregularities. It demands careful, precise installation to avoid job problems and owner complaints. Effects can be minimized by using Bevel edge or rough surface patterns instead of Square edge or smooth units, or by employing an exposed suspension. Shadows often can be eliminated or softened with draperies or blinds.

- 3 Dimension Uniformity**—In accordance with industry practice, all dimensions are nominal.

- 4 System Performance**—USG Interiors, Inc. will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.

ARCHITECTURAL SPECIFICATIONS

Part 1: General

1.1 Scope

Work includes suspension system, acoustical materials, and, where applicable, integrated lighting, heating, and ventilating components.

1.2 Qualifications

Suspension systems and acoustical material including all necessary hangers, grillage, splines and supporting hardware, shall be furnished and installed by an acoustical contractor.

1.3 Reference

- A** ASTM C635, Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B** ASTM C636, Recommended Practice for Installation of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- C** ASTM C645, Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
- D** ASTM C841, Standard Specification for Installation of Interior Lathing and Furring.
- E** ASTM E119, Standard Methods of Fire Tests of Building Construction and Materials.
- F** Underwriters' Laboratories, Inc. (UL) Fire Resistance Directory Listing and Classification.

1.4 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.5 Environmental Conditions

Building shall be enclosed with all windows and exterior doors in place and glazed, and roof watertight before installation of suspension system. Permanent heating and cooling equipment shall be in operation, and residual moisture from plaster, concrete or terrazzo work shall have dissipated. Interior temperatures shall range from 60-80°F (15.5-29.4°C); relative humidity shall be not more than 70%.

1.6 Sequencing/Scheduling

- A** General: Coordinate with other work supported by or penetrating ceiling, including mechanical/electrical work and partition systems.
- B** Mechanical work: Ductwork and heating system shall be complete before installation of suspension.
- C** Electrical work: Conduit installation shall be complete before installation of suspension.

1.7 Protection

Protect completed work above suspension system from damage during installation of suspension system components.

Part 2: Products

2.9 DOWN Suspension Systems

By USG Interiors, Inc.:

2.9.1 Concealed (DX) (Fire-Rated DXL).

Double-web main tees and (cross tees) (splines) (locking stabilizer bars). Per UL Design No. ().

2.9.2 Exposed DX. 1½" main tees and (1") (1½") cross tees, item no. (), () color. Plug-in positive-lock insertion. Pull-out tension values >300 lbs.

2.9.3 Fire-Rated Exposed (DXL) (DXLA). 12' x 1½" main tees and (1") (1½") cross tees, item no. (), () color. Per UL Design No. (). Plug-in positive-lock insertion. Pull-out tension values >300 lbs.

2.9.4 CENTRICITEE (DXT) (Fire-Rated DXLT).

Double-web Intermediate-duty main tees with ⅝" face, item no. (), () color. (Per UL Design No. [].) Panel-centering device. Pull-out tension values >300 lbs.

2.9.5 MERIDIAN DXM. Double-web Intermediate-duty 1½" main tees with ⅝" face and ½" recess, 1½" cross tees, item no. (), () color.

2.9.6 FINELINE (DXF) (Fire-Rated DXLF).

Double-web (Intermediate-duty) (Heavy-duty) main tees and 1⅝" cross tees, (optional painted recess [black] [white]), item no. (), () color. (Per UL Design No. [].) Plug-in positive-lock insertion. Pull-out tension values >300 lbs.

2.9.7 Highline (HIC) (HCC). (1⅝" Intermediate-duty) (2¼" Heavy-duty) main tees 1½", 1⅝", 2¼" cross tees, (optional painted recess [black] [white]), (smooth) (medium) (heavy) texture, item no. (), white extruded aluminum.

2.9.8 Geometrix GTX Ceiling System.

Double-web intermediate-duty main tees and 1⅝" cross tees, item no. (), () color. Plug-in positive-lock insertion. Pull-out tension values >300 lbs.

2.9.9 INTERSECTIONS ITX Ceiling System. 1½" high tees, 29" long, installed in a basketweave, pinwheel configuration with 24" x 24" and 5" x 5" panels.

2.9.10 Environmental (ZXA) (Fire-Rated ZXLA) Grid System. 1½" double webbed galvanized steel body with painted aluminum cap and stainless steel DX clips. Meets ASTM C635

requirements for Intermediate duty suspension. Item no. () (per UL Design []).

2.9.11 Environmental AX Grid System.

All-aluminum, double-web 1½" main tees and 1½" cross tees, connected with stainless steel DX clip, () color, item no. ().

2.9.12 RIGID-X Drywall Suspension System.

Direct-hung heavy-duty single-web steel main tees, with (furring channels) (furring cross tees) and cross tees at light fixtures. Per UL Design No. (), for (1) (1½) (2) (3) hour fire rating.

Note to specifier: Refer to product descriptions (pages 4-11) for item numbers, and to pages 2-3 for color options.

Part 3: Execution

3.1 Installation

- A** Install acoustical material and suspension system, including necessary hangers, grillage, splines and other supporting hardware, in accordance with ASTM C636 and manufacturer's instructions. Allowable tolerances per ASTM C636.
- B** Space hanger wires on main tees a max. of 48" or as specified by UL fire resistance directory, attaching hangers directly to structure above. Do not support wires from mechanical or electrical equipment, piping, or other equipment above ceiling. Provide additional hanger wires as required to meet seismic, fire-rating or local code requirements.
- C** Install hold down clips when panels weigh less than 1.0 lbs./ft.² in fire-rated installations.
- D** Install INTERSECTIONS System according to instructions supplied by USG Interiors, Inc.

3.2 Cleaning

- A** Immediately remove any foreign substances (e.g., paper paste), from molding and tees.
- B** Repainting shall be with a paint type and application method recommended for use over metal surfaces.

3.3 Air Diffusers

- A** Furnish and install air boots and air diffusers as specified in contractor documents.
- B** (DOWN) air diffuser assemblies required, finished to match exposed surfaces on suspension components.

3.4 Lighting

Refer to Section 16500 in Sweet's General Building & Renovation File.

For additional specifications and technical information, contact your USG Interiors sales representative.

For further information . . .

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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Interiors from every angle.™

USG Interiors, Inc.
101 South Wacker Drive
Chicago, Illinois 60606-4385

SA-905

Ceiling Systems

USG Interiors, Inc.



USG

STANDARD COLORS FOR CEILING PANELS AND SUSPENSION SYSTEMS



Canyon (067)



Desert Rose (091)



Peach (141)



Beige (142)



Sunset (100)



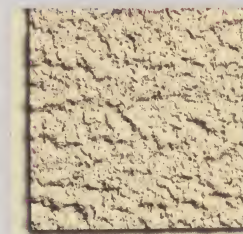
Mist (053)



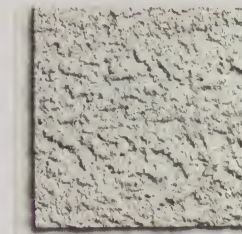
Quartz (082)



Dusk (191)



Parchment (103)



Willow (073)



Aquamarine (081)



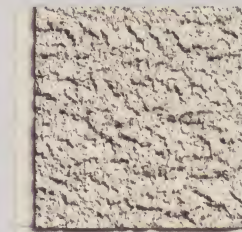
Taupe (107)



Sandstone (090)



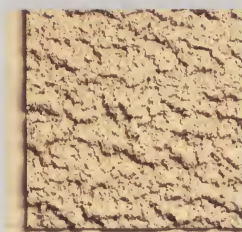
Alabaster (104)



Silvertone (052)



Manila (246)



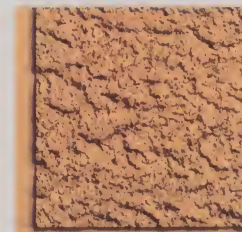
Fawn (181)



Melon (646)



Straw (143)



Caramel (144)*



Ice Blue (093)



Cranberry (099)*



Brownstone (075)*



Black (005)*

CONTRASTING FINISHES FOR SUSPENSION SYSTEMS

Eight contrasting finishes (not shown) are available as standard products. For swatches of these finishes, refer to the Up

With Color Selector, SC-937, or contact your USG Interiors representative.

Brass (065)
Bronze (033)
Chrome (066)
Silver Satin (002)
Tierra Brown (092)

Woodgrain (034)
White (004)
Flat White (050)

UP WITH COLOR USG Interiors features 24 fresh, modern colors on selected acoustical panels and tile. Or any custom color can be specified. For design integrity, the same 24 standard colors are available on most DONN® suspension systems. As with panels, grid colors can be custom matched.

Product color is of the highest quality. ACOUSTONE® panels are colored clear through to mask surface scratches. Color compatibility extends to contemporary treatments for walls, furniture and fabrics, offering the perfect ceiling solution for unique, carefully planned interiors.

Color samples to meet project needs are free upon request. Call 1-800-USG-7272 toll-free for immediate service. In Minnesota call 218-879-2800.

Color Uniformity: Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings is within normally accepted commercial tolerance.

Substrate texture, room lighting and subjectivity of observer can affect perceived color of ceiling material. In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton) to minimize the effect.

These color reproductions show colors that are as close as possible within printing limitations to actual products. For a more representative match to actual production material, see ACOUSTONE and AURATONE® product samples offered by your USG Interiors sales representative.

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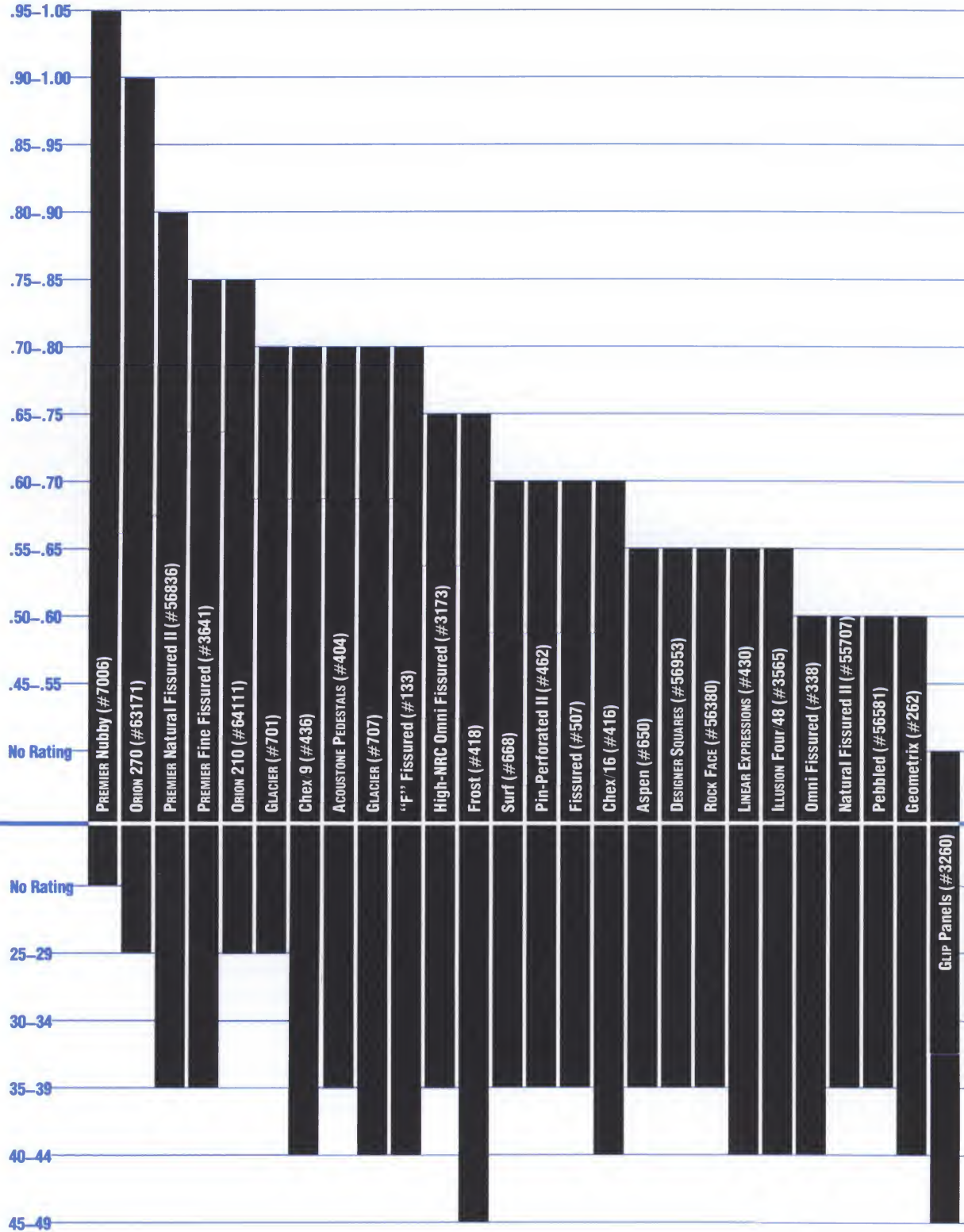
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Color Availability 51

This chart provides peak acoustical ratings for a sampling of our most popular panels. For more information, refer to individual product descriptions on pages 6-36.

Noise Reduction Coefficient (NRC)

Sound Transmission Class (STC)



ORION CEILING PANELS The result of brand new technology, ORION ceiling panels offer an unmatched combination of fire resistance, high NRCs and excellent STCs. They also provide superior stain resistance and dimensional stability, allowing installation during early stages of construction, even in areas where intermittent heating and cooling are expected. The firm, stable panel base makes field cuts easy and prevents panel flutter.

ORION ceiling panels feature a choice of three pleasing, modern textures. Panels are laminated to high-light-reflecting white Nubby fabric or washable vinyl film in two patterns. All ORION ceiling panels are ideal for commercial applications such as demanding open office settings or wherever both significant speech privacy and noise reduction are required.

These revolutionary panels withstand temperature and humidity conditions of 90°F/90% RH without visible sag. Thermal resistance R-factors (at 75°F mean temperature) are 1.79 for ½" panels, 2.15 for ¾" panels and 3.07 for 1" panels. Surface burning characteristics are flame spread 25/smoke developed 30 for ORION 210 and 220 panels, 20/5 for ORION 270 panels.

270

High quality, woven fabric surface. The panel base has no yellow undercast, giving a better color match to white grid.

- ORION 270: Nubby cloth face

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

ORION 270**Panels**

2' x 2' x 3/4"	SQ	66171	.80-.90	25-29	66178	.70-.80	25-29
2' x 4' x 3/4"	SQ	68171	.80-.90	25-29	68178	.70-.80	25-29
2' x 2' x 1"	SQ	61171	.90-1.00	25-29	N/A	—	—
2' x 4' x 1"	SQ	63171	.90-1.00	25-29	N/A	—	—
2' x 2' x 3/4"	SL	66271	.80-.90	25-29	66278	.75-.85	25-29
2' x 4' x 3/4"	SL	68271	.80-.90	25-29	68278	.75-.85	25-29
2' x 2' x 1"	SL	61271	.90-1.00	25-29	N/A	—	—
2' x 4' x 1"	SL	63271	.90-1.00	25-29	N/A	—	—
2' x 2' x 3/4"	FL	66371	.80-.90	25-29	66378	.75-.85	25-29
2' x 4' x 3/4"	FL	68371	.80-.90	25-29	68378	.75-.85	25-29
2' x 2' x 1"	FL	61371	.90-1.00	25-29	N/A	—	—
2' x 4' x 1"	FL	63371	.90-1.00	25-29	N/A	—	—

STC ORION 270**Panels With Backing**

2' x 2' x 3/4"	SQ	66175	.75-.85	35-39	66179	.70-.80	35-39
2' x 4' x 3/4"	SQ	68175	.70-.80	35-39	N/A	—	—
2' x 2' x 1"	SQ	61175	.80-.90	35-39	N/A	—	—
2' x 4' x 1"	SQ	63175	.80-.90	35-39	N/A	—	—
2' x 2' x 3/4"	SL	66275	.75-.85	35-39	66279	.70-.80	35-39
2' x 4' x 3/4"	SL	68275	.75-.85	35-39	N/A	—	—
2' x 2' x 1"	SL	61275	.80-.90	35-39	N/A	—	—
2' x 4' x 1"	SL	63275	.80-.90	35-39	N/A	—	—
2' x 2' x 3/4"	FL	66375	.75-.85	35-39	66379	.70-.80	35-39
2' x 4' x 3/4"	FL	68375	.75-.85	35-39	N/A	—	—
2' x 2' x 1"	FL	61375	.80-.90	35-39	N/A	—	—
2' x 4' x 1"	FL	63375	.80-.90	35-39	N/A	—	—

(1) For edge drawings, see page 40.

ORION 270

Color—White

**Recommended
Suspensions**

- Square edge panels
 - DX, DXL
 - CENTRICITEE
 - MERIDIAN
- Shadowline edge panels
 - DX, DXL
- Fineline edge panels
 - CENTRICITEE
 - MERIDIAN
 - FINELINE
 - Highline

**ORION 270 panels/
Fineline suspension**



210

220

Laminated vinyl surfaces in contemporary, light textures.

- ORION 210: intricate, fabric-like directional pattern
- ORION 220: three-dimensional curves and crevices

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

ORION 210

Panels

2' x 2' x 1/2"	SQ	62111	.75-.85	25-29	N/A	—	—
2' x 2' x 3/4"	SQ	N/A	—	—	66118	.70-.80	25-29
2' x 4' x 1/2"	SQ	64111	.75-.85	25-29	N/A	—	—
2' x 4' x 3/4"	SQ	N/A	—	—	68118	.70-.80	25-29

ORION 220

Panels

2' x 2' x 1/2"	SQ	62121	.75-.85	25-29	N/A	—	—
2' x 2' x 3/4"	SQ	N/A	—	—	66128	.70-.80	25-29
2' x 4' x 1/2"	SQ	64121	.75-.85	25-29	N/A	—	—
2' x 4' x 3/4"	SQ	N/A	—	—	68128	.70-.80	25-29

(1) For edge drawings, see page 40.

ORION 210 panels/
DX suspension



ORION 210

Color—White

ORION 220

Color—White

Recommended Suspensions

- Square edge panels
- DX, DXL
- CENTRICITEE
- MERIDIAN



ACOUSTONE PANELS AND TILE

ACOUSTONE natural textured ceiling panels and tile offer unsurpassed esthetics and superb acoustics. These are the highest quality mineral fiber ceiling products available in the industry. Each molded unit is uniquely patterned, which provides a natural look and avoids a repetitive, machine-made appearance. ACOUSTONE panels and tile are colored clear through, so that surface scratches will be virtually invisible. The full line of 24 colors is available on most patterns. Flame spread and thermal properties for ACOUSTONE products are excellent. Surface burning characteristics: flame spread 15; smoke developed 0-15. ACOUSTONE FIRECODE® products achieve fire ratings up

to 2 hours. Thermal resistance

R-factor (at 75°F mean temperature) is 2.12. Because of their aluminum foil backing, ACOUSTONE products resist soiling.

Random

Narrow

Wide



Random

Colors—Manila, Silvertone, Parchment, Taupe, Mist²

Narrow

Colors—Manila, Silvertone, Parchment, Taupe, Mist²

Wide

Colors—Manila, Silvertone, Parchment, Taupe, Mist²

Recommended Suspensions

- Shadowline edge panels
- DX®, DXL
- Fineline edge panels
- CENTRICITEE
 - FINELINE®
 - MERIDIAN®
 - Highline

Three surfaces inspired by linear patterns in nature. Textures and selected natural colors blend beautifully with natural design settings. Especially compatible with stone, marble and other earth-hewn design materials.

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

RANDOM

Panels

2' x 2' x 3/4"	Shadowline	434	.55-.65	40-44	439	.55-.65	35-39
2' x 2' x 3/4"	Fineline	435	.55-.65	40-44	N/A	—	—

NARROW

Panels

2' x 2' x 3/4"	Shadowline	429	.55-.65	40-44	437	.55-.65	35-39
2' x 2' x 3/4"	Fineline	430	.55-.65	40-44	N/A	—	—

WIDE

Panels

2' x 2' x 3/4"	Shadowline	431	.55-.65	35-39	438	.55-.65	35-39
2' x 2' x 3/4"	Fineline	433	.55-.65	35-39	N/A	—	—

(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

LINEAR EXPRESSIONS Random panels/FINELINE suspension



Delicate surface texture, designed to create subtle, tasteful ceilings. Available in 24 colors.

- Frost: tightly textured for a soft, light look

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

FROST

Panels

2' x 2' x 3/4"	Square	412	.65-.75	40-44	413	.65-.75	40-44
2' x 2' x 3/4"	Shadowline	414	.65-.75	40-44	415	.65-.75	40-44
2' x 2' x 3/4"	Fineline	418	.65-.75	40-44 ²	N/A	—	—

Tile

12" x 12" x 3/4"	Bevel Edge/Kerf	410	.65-.75	25-29	N/A	—	—
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(1) For edge drawings, see page 40.

(2) STC 45-49 available on request.



Frost

Colors—White plus 24 colors

Recommended Suspensions

Square edge panels

- DX, DXL

Shadowline edge panels

- DX, DXL

Fineline edge panels

- CENTRICITEE
- MERIDIAN
- FINELINE
- Highline

Bevel Edge/Kerf tile

- DX Concealed

Frost

Frost panels/FINELINE suspension



GLACIER



GLACIER

Colors—White plus 24 colors³

Recommended Suspensions

- Square edge panels
 - DX, DXL
- Shadowline edge panels
 - DX, DXL
- Fineline edge panels
 - CENTRICITEE
 - MERIDIAN
 - FINELINE
 - Highline
- Square Edge/Kerf tile
 - DX Concealed

Distinctive, rough textured panels and tile, available in 24 colors. Rich surface detail resembles natural sculptured stone. Enhances other natural materials such as wood, marble, quarried stone and glass block. Designed to create prominent, elegant ceilings.

- GLACIER: exceptionally deep, natural texture

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

GLACIER

Panels

2' x 2' x 3/4"	Square	706	.70-.80	35-39	714	.65-.75	35-39
2' x 4' x 3/4"	Square	764	.70-.80	35-39	N/A	—	—
2' x 2' x 3/4"	Shadowline	707	.70-.80	40-44	715	.65-.75	35-39
2' x 4' x 3/4"	Shadowline	711	.70-.80	35-39	N/A	—	—
2' x 2' x 3/4"	Fineline	708	.70-.80	40-44 ²	N/A	—	—

Tile

12" x 12" x 3/4"	Square Edge/Kerf	701	.70-.80	25-29	713	.75-.85	35-39
------------------	------------------	-----	---------	-------	-----	---------	-------

(1) For edge drawings, see page 40.

(2) STC 45-49 available on request.

(3) Tile available in white; also, see sales representative for availability of specific colors.

GLACIER panels/Fineline suspension



PEDESTALS

Chex/9

Chex/4

Chex/16

Checkmate

Checkline

Contemporary scored patterns, with fine textured Frost surface for great sound absorption. Standard panels are designed to incorporate narrow $\frac{1}{16}$ " grid into the overall ceiling design.

- PEDESTALS I and IV: triple step-cut 2' x 2' and 6" x 6" modules
- Chex/9: 4" x 4" squares
- Chex/4: classic 12" x 12" squares
- Chex/16: 6" x 6" squares, embellished with double reveals
- Checkmate: ideal for expansive ceilings
- Checkline: linear scored
- Many unique scored patterns can be quickly produced to your specifications

Chex/16
panels/MERIDIAN
suspension



Size	Edge ⁽¹⁾	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

PEDESTALS I

Panels

2' x 2' x 3/4"	Special	400	.65-.75	35-39	N/A	—	—
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PEDESTALS IV

Panels

2' x 2' x 3/4"	Special	404	.70-.80	35-39	N/A	—	—
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CHEX / 9

Panels

2' x 2' x 3/4"	Special	436	.70-.80	40-44	N/A	—	—
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CHEX / 4

Panels

2' x 2' x 3/4"	Special	448	.60-.70	40-44	N/A	—	—
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CHEX / 16

Panels

2' x 2' x 3/4"	Special	416	.60-.70	40-44	N/A	—	—
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CHECKMATE

Panels

2' x 2' x 3/4"	Special	432	.55-.65	40-44	N/A	—	—
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CHECKLINE

Panels

2' x 2' x 3/4"	Special	427	.60-.70	40-44	N/A	—	—
----------------	---------	-----	---------	-------	-----	---	---

(1) For edge drawings, see page 40. Fineline edge is available on request.

(2) See sales representative for availability of specific colors.

PEDESTALS I

Colors—White plus 24 colors

PEDESTALS IV

Colors—White²

Chex/9

Colors—White²

Chex/4

Colors—White²

Chex/16

Colors—White²

Checkmate

Colors—White²

Checkline

Colors—White²

Recommended Suspensions

- Special edge panels
- CENTRICITEE
 - MERIDIAN



Finesse

"F" Fissured



Finesse

Colors—White²

"F" Fissured

Colors—White²

Recommended Suspensions

- Square edge panels
- DX, DXL
- Shadowline edge panels
- DX, DXL
- Fineline edge panels
- CENTRICITEE
- MERIDIAN
- FINELINE
- Highline
- Square Edge/Kerf tile
- DX Concealed
- Bevel Edge/Kerf tile
- DX Concealed

Natural surfaces for versatile, moderately textured ceilings. Great sound ratings. Available in a wide selection of size and edge combinations.

- Finesse: deeply planed, smooth surface, with only the finest micro-fissures remaining
- "F" Fissured: moderately planed, random fissures, for a natural-chiseled look

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

F I N E S S E

Tile

12" x 12" x 3/4"	Bevel Edge/Kerf	N/A	—	—	790	.65-.75	35-39
------------------	-----------------	-----	---	---	-----	---------	-------

' F ' F I S S U R E D

Panels

2' x 2' x 3/4"	Square	131	.65-.70	35-39	140	.65-.75	35-39
2' x 4' x 3/4"	Square	135	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	Shadowline	132	.70-.80	40-44	141	.65-.75	40-44
2' x 4' x 3/4"	Shadowline	136	.70-.80	40-44	N/A	—	—
2' x 2' x 3/4"	Fineline	133	.70-.80	40-44	N/A	—	—

Tile

12" x 12" x 3/4"	Square Edge/Kerf	101	.65-.75	30-34	138	.70-.80	35-39
12" x 12" x 3/4"	Bevel Edge/Kerf	102	.65-.75	30-34	139	.70-.80	35-39

(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

AURATONE PANELS AND TILE

For economical, sound-efficient ceilings, choose panels or tile from the water-felted AURATONE line. The water-felting process forms lightweight mineral fiber units that provide a superb balance of sound absorption and attenuation.

This versatile product line offers hundreds of design options. Dozens of texture possibilities—including rough, granular,

smooth, faceted, perforated and fissured.

Twenty-four colors available on most patterns add to the design possibilities. Sizes range from 12"x12" tile to 30"x60" panels.

Flame spread and thermal properties are excellent. AURATONE FIRECODE products achieve UL fire ratings up to 3 hours. Surface burning characteristics (flame spread/smoke developed) are 25/10 (15/10 for Natural Fissured II and Aurora FIRECODE products). Thermal resistance R-factors (at 75°F mean temperature) are 2.18 for 3/4"-thick products, 1.85 for 5/8"-thick products.

AURATONE ceilings resist soiling and, with optional plastic coating (white only), can be cleaned easily using only a damp sponge. The plastic coating has been Gardner-Scrubability tested to 3000 cycles.



Nine/Two-24

Sixteen/6

Eighty-one/2

Sixty-four/3

Nine/Two-24

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist²

Sixteen/6

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist²

Eighty-one/2

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist²

Sixty-four/3

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist²

Recommended Suspensions

Interline Tapered edge panels

- CENTRICITEE
- MERIDIAN

Precision face-cuts in elegant miniature patterns. Scoring blends with CENTRICITEE and MERIDIAN grid.

- Nine/Two-24: nine linear bars, 24" long and 2" wide
- Sixteen/6: four quadrants cross-scored with $\frac{1}{16}$ " cuts; each quadrant cross-scored with $\frac{1}{4}$ " cuts into 6" x 6" squares
- Eighty-one/2: 2" x 2" squares in a $\frac{1}{16}$ " routing
- Sixty-four/3: four quadrants cross-scored with $\frac{1}{16}$ " cuts; each quadrant cross-scored with $\frac{1}{4}$ " cuts into 3" x 3" squares

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

PROFILE SERIES

PROFILE Nine/Two-24 Panels

2' x 2' x $\frac{5}{8}$ "	ILT	5024	.30-.40	35-39	N/A	—	—
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PROFILE Sixteen/6 Panels

2' x 2' x $\frac{5}{8}$ "	ILT	5025	.30-.40	35-39	N/A	—	—
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PROFILE Eighty-one/2 Panels

2' x 2' x $\frac{5}{8}$ "	ILT	5026	.30-.40	35-39	N/A	—	—
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PROFILE Sixty-four/3 Panels

2' x 2' x $\frac{5}{8}$ "	ILT	5028	.30-.40	35-39	N/A	—	—
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(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

Triple step-cut panels in Fine Fissured surface and four module sizes. Layered cuts blend with narrow $\frac{1}{16}$ " grid.

- PEDESTALS I: step-cut detailing only at panel edges
- PEDESTALS II: narrow proportioned 12" x 24" modules
- PEDESTALS IV: elegant 12" x 12" tile look
- PEDESTALS IX: smaller 8" x 8" modules

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

PEDESTALS

PEDESTALS I Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3670	(2)	40-44	N/A	—	—
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PEDESTALS II Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3672	(2)	40-44	N/A	—	—
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PEDESTALS IV Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3674	(2)	40-44	N/A	—	—
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PEDESTALS IX Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3679	(2)	40-44	N/A	—	—
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(1) For edge drawings, see page 40.

(2) Standard NRC range is .25-.35, NRC .55-.65 available on request.

(3) See sales representative for availability of specific colors.

Recommended Suspensions

Interline Tapered edge panels

- CENTRICITEE
- MERIDIAN

PEDESTALS I

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist³

PEDESTALS II

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist³

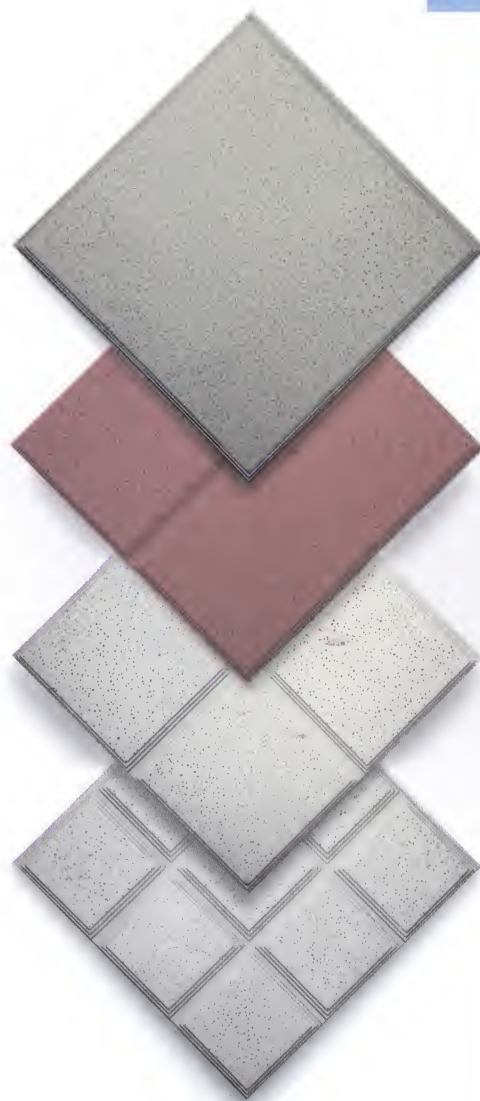
PEDESTALS IV

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist³

PEDESTALS IX

Colors—White, Manila, Silvertone, Taupe, Parchment, Mist³

PEDESTALS IX panels, Fine Fissured pattern/CENTRICITEE suspension



DESIGNER SQUARES

PRISMS

Face-cut panels that update any room.

Designed for use where a scored, geometric ceiling is desired. DESIGNER SQUARES come in one surface pattern, Natural Fissured II; standard $\frac{15}{16}$ " and $\frac{9}{16}$ " face routings. PRISMS are available in two surface patterns: Omni Fissured and Tahoe.

- DESIGNER SQUARES I: thirty-six 3" x 3" squares
- DESIGNER SQUARES II: six 3" x 24" linear bars
- DESIGNER SQUARES III: twenty-five 4" x 4" squares
- DESIGNER SQUARES IV: eleven 1" x 24" linear bars
- PRISMS: faceted panels in two textured patterns

DESIGNER SQUARES I

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe

DESIGNER SQUARES II

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe

DESIGNER SQUARES III

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe

DESIGNER SQUARES IV

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe

PRISMS

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe

Recommended Suspensions

Shadowline edge $\frac{15}{16}$ " routing
 • DX, DXL
 Finline edge $\frac{9}{16}$ " routing
 • CENTRICITEE
 • MERIDIAN

Size	Edge ¹	Pattern	Regular			FIRECODE ²		
			Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

DESIGNER SQUARES

Panels

2' x 2' x $\frac{3}{4}$ "	Shadowline, Natural	56853	.55-.65	35-39	5662	.55-.65	35-39
	$\frac{15}{16}$ " routing Fissured II						
I	Finline, Natural	56953	.55-.65	35-39	5663	.55-.65	35-39
	$\frac{9}{16}$ " routing Fissured II						
2' x 2' x $\frac{3}{4}$ "	Shadowline, Natural	56851	.50-.60	40-44	5664	.50-.60	40-44
	$\frac{15}{16}$ " routing Fissured II						
II	Finline, Natural	56951	.50-.60	40-44	5665	.50-.60	40-44
	$\frac{9}{16}$ " routing Fissured II						
2' x 2' x $\frac{3}{4}$ "	Shadowline, Natural	56854	.55-.65	35-39	5666	.55-.65	35-39
	$\frac{15}{16}$ " routing Fissured II						
III	Finline, Natural	56954	.55-.65	35-39	5667	.55-.65	35-39
	$\frac{9}{16}$ " routing Fissured II						
2' x 2' x $\frac{3}{4}$ "	Shadowline, Natural	56855	.50-.60	40-44	5668	.50-.60	40-44
	$\frac{15}{16}$ " routing Fissured II						
IV	Finline, Natural	56955	.50-.60	40-44	5669	.50-.60	40-44
	$\frac{9}{16}$ " routing Fissured II						

PRISMS

Panels

2' x 2' x $\frac{3}{4}$ "	Prisms	Omni Fissured	3991	.50-.60	40-44	N/A	—	—
2' x 2' x $\frac{3}{4}$ "	Prisms	Tahoe	3990	.50-.60	40-44	N/A	—	—

(1) For edge drawings, see page 40.

(2) FIRECODE DESIGNER SQUARES panels measure 2' x 2' x $\frac{7}{8}$ ".

DESIGNER SQUARES II panels,
 Natural Fissured II
 pattern/CENTRICITEE
 suspension



Two/24

Four/48

Eight/12

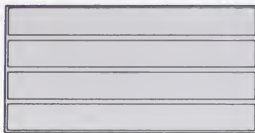
Thirty-two/6

Three/20



Two/24

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe²



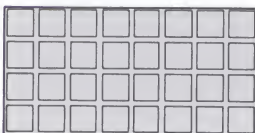
Four/48

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe²



Eight/12

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe²



Thirty-two/6

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe²



Three/20

Colors—White, Manila, Mist, Silvertone, Parchment, Taupe²

ILLUSION Ceiling Series panels blend low-gloss, exposed suspension grids into the overall ceiling plane. Available in three surface patterns: Omni Fissured, Aspen and Corona. Standard routings: $\frac{9}{16}$ " and $\frac{15}{16}$ " for compatibility with narrow and standard grid widths.

- Two/24: square-module 2' x 2' panel look with 2' x 4' economy
- Four/48: 48" x 6" linear strips
- Eight/12: 12" x 12" tile look
- Thirty-two/6: the look of 6" x 6" tile
- Three/20: smaller 20" x 20" square-module panel look

Size	Edge ¹	Pattern	Regular			FIRECODE		
			Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

T W O / 2 4

Panels

2' x 4' x $\frac{3}{4}$ "	SLT $\frac{15}{16}$ " routing	Omni Fissured	3575	.55-.65	40-44	3472	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	ILT $\frac{9}{16}$ " routing	Omni Fissured	3576	.55-.65	40-44	3084	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	SLT $\frac{15}{16}$ " routing	Aspen	652	.55-.65	40-44	3378	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	ILT $\frac{9}{16}$ " routing	Aspen	6529	.55-.65	40-44	3205	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	SLT $\frac{15}{16}$ " routing	Corona	3802	.55-.65	40-44	3822	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	ILT $\frac{9}{16}$ " routing	Corona	3812	.55-.65	40-44	3832	.55-.65	40-44

F O U R / 4 8

Panels

2' x 4' x $\frac{3}{4}$ "	SLT $\frac{15}{16}$ " routing	Omni Fissured	3565	.55-.65	40-44	3465	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	ILT $\frac{9}{16}$ " routing	Omni Fissured	3567	.55-.65	40-44	3085	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	SLT $\frac{15}{16}$ " routing	Aspen	653	.55-.65	40-44	3379	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	ILT $\frac{9}{16}$ " routing	Aspen	6539	.55-.65	40-44	3206	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	SLT $\frac{15}{16}$ " routing	Corona	3804	.55-.65	40-44	3824	.55-.65	40-44
2' x 4' x $\frac{3}{4}$ "	ILT $\frac{9}{16}$ " routing	Corona	3814	.55-.65	40-44	3834	.55-.65	40-44

Size	Edge ¹	Pattern	Regular			FIRECODE		
			Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

EIGHT / 12

Panels

2' x 4' x 3/4"	SLT 15/16" routing	Omni Fissured	3570	.50-.60	40-44	3470	.50-.60	40-44
2' x 4' x 3/4"	ILT 9/16" routing	Omni Fissured	3571	.50-.60	40-44	3391	.55-.65	40-44
2' x 4' x 3/4"	SLT 15/16" routing	Aspen	654	.55-.65	40-44	3380	.55-.65	40-44
2' x 4' x 3/4"	ILT 9/16" routing	Aspen	6549	.55-.65	40-44	3207	.55-.65	40-44
2' x 4' x 3/4"	SLT 15/16" routing	Corona	3808	.55-.65	35-39	3828	.55-.65	40-44
2' x 4' x 3/4"	ILT 9/16" routing	Corona	3818	.55-.65	35-39	3838	.55-.65	40-44

THIRTY-TWO / 6

Panels

2' x 4' x 3/4"	SLT 15/16" routing	Omni Fissured	3578	.50-.60	40-44	3473	.50-.60	40-44
2' x 4' x 3/4"	ILT 9/16" routing	Omni Fissured	3577	.50-.60	40-44	3471	.55-.65	40-44
2' x 4' x 3/4"	SLT 15/16" routing	Aspen	656	.55-.65	40-44	3381	.55-.65	40-44
2' x 4' x 3/4"	ILT 9/16" routing	Aspen	6569	.55-.65	40-44	3208	.55-.65	40-44
2' x 4' x 3/4"	SLT 15/16" routing	Corona	3806	.50-.60	40-44	3826	.50-.60	40-44
2' x 4' x 3/4"	ILT 9/16" routing	Corona	3816	.50-.60	40-44	3836	.55-.65	40-44

THREE / 20

Panels

20" x 60" x 3/4"	SLT 15/16" routing	Omni Fissured	3580	.50-.60	40-44	3046	.55-.65	40-44
20" x 60" x 3/4"	ILT 9/16" routing	Omni Fissured	3581	.50-.60	40-44	3048	.55-.65	40-44
20" x 60" x 3/4"	SLT 15/16" routing	Aspen	655	.55-.65	40-44	3382	.55-.65	40-44
20" x 60" x 3/4"	ILT 9/16" routing	Aspen	6559	.55-.65	40-44	3209	.55-.65	40-44
20" x 60" x 3/4"	SLT 15/16" routing	Corona	3803	.50-.60	40-44	3823	.55-.65	40-44
20" x 60" x 3/4"	ILT 9/16" routing	Corona	3813	.50-.60	40-44	3833	.55-.65	40-44

(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

Sections of Thirty-two/6 panels shown with available surface patterns:
Omni Fissured
Corona
Aspen



Recommended Suspensions

Shadowline Tapered edge 15/16" routing
• DX, DXL
Interline Tapered edge 9/16" routing
• CENTRICITEE
• MERIDIAN

Allegro

Calypso

Surf

Allegro

Colors—White plus 24 colors

Calypso

Colors—White plus 24 colors

Surf

Colors—White on Gray, Designer White, Designer White on Beige

Recommended Suspensions

- Square edge panels
- DX, DXL
- CENTRICITEE
- MERIDIAN
- SLT edge panels
- DX, DXL
- ILT edge panels
- CENTRICITEE
- MERIDIAN
- Fineline edge panels
- FINELINE
- Highline
- Bevel Edge/Kerf tile
- DX Concealed

Surf and two new tailored patterns, to integrate beautifully with floor coverings, furniture fabrics, and window treatments. Ideal for tasteful, functional ceilings.

- Allegro: symmetrical, woven texture on a generous scale
- Calypso: soft, nonrepeating rivulets of texture with minute perforations
- Surf: shading and three-dimensional fissures

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

ALLEGRO

Panels

2' x 2' x 5/8"	Square	4501	.55-.65	35-39	4551	.60-.70	35-39
2' x 4' x 5/8"	Square	4500	.55-.65	35-39	4550	.60-.70	35-39
2' x 2' x 5/8"	SLT	4505	.50-.60	35-39	4555	.55-.65	35-39
2' x 4' x 5/8"	SLT	4506	.50-.60	35-39	4556	.55-.65	35-39
2' x 2' x 5/8"	ILT	4507	.50-.60	35-39	4557	.55-.65	35-39
2' x 2' x 5/8"	FL	4509	.50-.60	35-39	4559	.55-.65	35-39

Tile

12" x 12" x 5/8"	Bevel Edge/Kerf	4511	.50-.60	40-44	4561	.55-.65	40-44
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CALYPSO

Panels

2' x 2' x 5/8"	Square	4601	.55-.65	35-39	4651	.60-.70	35-39
2' x 4' x 5/8"	Square	4600	.55-.65	35-39	4650	.60-.70	35-39
2' x 2' x 5/8"	SLT	4605	.50-.60	35-39	4655	.55-.65	35-39
2' x 4' x 5/8"	SLT	4606	.50-.60	35-39	4656	.55-.65	35-39
2' x 2' x 5/8"	ILT	4607	.50-.60	35-39	4657	.55-.65	35-39
2' x 2' x 5/8"	FL	4609	.50-.60	35-39	4659	.55-.65	35-39

Tile

12" x 12" x 5/8"	Bevel Edge/Kerf	4611	.50-.60	40-44	4661	.55-.65	40-44
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SURF

White on Gray Panels

2' x 2' x 5/8"	Square	664	.55-.65	35-39	668	.60-.70	35-39
2' x 4' x 5/8"	Square	665	.55-.65	35-39	669	.60-.70	35-39
2' x 2' x 5/8"	SLT	661	.50-.60	35-39	667	.55-.65	35-39
2' x 2' x 5/8"	ILT						

White on Gray Tile

12" x 12" x 5/8"	Bevel Edge/Kerf	660	.50-.60	40-44	666	.55-.65	40-44
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Designer White Panels

2' x 2' x 5/8"	Square	5793	.55-.65	35-39	5812	.60-.70	35-39
2' x 4' x 5/8"	Square	5794	.55-.65	35-39	5811	.60-.70	35-39
2' x 2' x 5/8"	SLT	5796	.50-.60	35-39	5813	.55-.65	35-39
2' x 4' x 5/8"	SLT	5795	.55-.65	35-39	N/A	—	—

Designer White on Beige Panels

2' x 2' x 5/8"	SLT	5799	.50-.60	35-39	N/A	—	—
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(1) For edge drawings, see page 40.

Three patterns that offer a natural texture look, with the cost/performance advantages of water-felted products. Designed to create a prominent ceiling plane with a richly textured surface.

- Aspen: random, naturally sculptured appearance
- Tahoe: softly rounded, three-dimensional texture
- Aurora: bold, eroded texture

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

ASPEN

Panels

2' x 2' x 3/4"	SLT	650	.55-.65	35-39	3845	.60-.70	35-39
2' x 4' x 3/4"	SLT	651	.55-.65	35-39	3850	.60-.70	35-39
2' x 2' x 3/4"	ILT	644	.55-.65	35-39	643	.60-.70	35-39
2' x 2' x 3/4"	Fineline	649	.55-.65	35-39	N/A	—	—
2' x 2' x 3/4"	Fineline	648	.55-.65	35-39	N/A	—	—

TAHOE

Panels

2' x 2' x 5/8"	Square	632	.50-.60	35-39	N/A	—	—
2' x 4' x 5/8"	Square	633	.50-.60	35-39	N/A	—	—
2' x 2' x 3/4"	SLT	630	.50-.60	35-39	3820	.50-.60	35-39
2' x 4' x 3/4"	SLT	631	.50-.60	35-39	641	.50-.60	35-39
2' x 2' x 3/4"	ILT	645	.50-.60	35-39	641	.50-.60	35-39
2' x 2' x 3/4"	Fineline	647	.50-.60	35-39	N/A	—	—

AURORA

Panels

2' x 2' x 3/4"	SLT	55620	.45-.55	40-44	50620	.45-.55	40-44
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Tile

12" x 12" x 3/4"	Square Edge/Kerf	55441	.55-.65	40-44	50441	.60-.70	40-44
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(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

Aspen

Tahoe

Aurora

Aspen

Colors—White plus 24 colors²

Tahoe

Colors—White plus 24 colors²

Aurora

Color—White

Recommended Suspensions

- Square edge panels
 - DX
- SLT edge panels
 - DX, DXL
- ILT edge panels
 - CENTRICITEE
- MERIDIAN
- Fineline edge panels
 - FINELINE
 - Highline
- Square edge/kerf panels
 - DX Concealed

High-NRC Omni Fissured**PREMIER Natural Fissured II****High-NRC Fine Fissured****PREMIER Fine Fissured****High-NRC Omni Fissured**Colors—White plus 24 colors²**PREMIER Natural Fissured II**

Color—White

High-NRC Fine FissuredColors—White plus 24 colors²**PREMIER Fine Fissured**Colors—White plus 24 colors²

Excellent NRC's combined with optimum density, plus excellent STC's for privacy in closed-plan. All patterns also available in standard AURATONE ceilings for use in adjacent areas.

- High-NRC Omni Fissured: lightly fissured, heavily perforated
- PREMIER Natural Fissured II: deeply fissured, moderately perforated
- High-NRC and PREMIER Fine Fissured: finest fissures and perforations

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

HIGH-NRC OMNI FISSURED**Panels**

2' x 2' x 3/4"	Square	3173	.65-.75	35-39	N/A	—	—
2' x 4' x 3/4"	Square	3178	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	SLT	3148	.65-.75	35-39	N/A	—	—

PREMIER NATURAL FISSURED II**Panels**

2' x 2' x 7/8"	SLT	N/A	—	—	50832	.70-.80	35-39
2' x 4' x 7/8"	Square	N/A	—	—	56836	.80-.90	35-39
20" x 60" x 7/8"	Square	N/A	—	—	56835	.75-.85	35-39
2' x 2' x 7/8"	Fineline	N/A	—	—	3396	.70-.80	35-39

HIGH-NRC FINE FISSURED**Panels**

2' x 2' x 3/4"	Square	3661	.65-.75	35-39	N/A	—	—
2' x 4' x 3/4"	Square	3660	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	SLT	3662	.65-.75	35-39	N/A	—	—

PREMIER FINE FISSURED**Panels**

2' x 2' x 7/8"	Square	N/A	—	—	3641	.75-.85	35-39
2' x 4' x 7/8"	Square	N/A	—	—	3640	.75-.85	35-39
2' x 5' x 7/8"	Square	N/A	—	—	3646	.75-.85	35-39
20" x 60" x 7/8"	Square	N/A	—	—	3644	.75-.85	35-39
2' x 2' x 7/8"	SLT	N/A	—	—	3642	.70-.80	35-39
2' x 4' x 7/8"	SLT	N/A	—	—	3643	.70-.80	35-39
2' x 2' x 7/8"	ILT	N/A	—	—	3647	.70-.80	35-39
2' x 2' x 7/8"	Fineline	N/A	—	—	3397	.70-.80	35-39

(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

Random fissured patterns that come in 24 colors and a wide selection of size and edge combinations. Designed for use where a well-defined ceiling plane with a distressed surface is desired.

- **Omni Fissured:** lightly fissured, heavily perforated
- **Natural Fissured II:** deeply fissured, moderately perforated

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

OMNI FISSURED

Panels

2' x 2' x 5/8"	Square	344	.50-.60	35-39	338	.50-.60	40-44
2' x 4' x 5/8"	Square	345	.50-.60	35-39	339	.50-.60	40-44
2' x 4' x 3/4"	Square	343	.60-.70	40-44	3742	.55-.65	40-44
2' x 2' x 5/8"	SLT	323	.50-.60	35-39	336	.50-.60	35-39
2' x 2' x 3/4"	SLT	341	.55-.65	35-39	3385	.50-.60	35-39
2' x 4' x 5/8"	SLT	330	.50-.60	35-39	337	.50-.60	35-39
2' x 4' x 3/4"	SLT	332	.55-.65	35-39	3334	.50-.60	35-39
2' x 2' x 5/8"	ILT	5530	.50-.60	35-39	3386	.55-.65	35-39
2' x 2' x 5/8"	Fineline	5551	.50-.60	35-39	5751	.50-.60	35-39
2' x 2' x 3/4"	Fineline	3025	.55-.65	35-39	3392	.50-.60	35-39

Tile

12" x 12" x 5/8"	Bevel Edge/Kerf	320	.50-.60	40-44	335	.55-.65	40-44
12" x 12" x 3/4"	Bevel Edge/Kerf	340	.55-.65	45-49	N/A	—	—

NATURAL FISSURED II

Panels

2' x 2' x 5/8"	Square	56704	.50-.60	35-39	56766	.50-.60	35-39
2' x 4' x 5/8"	Square	56705	.50-.60	35-39	56765	.50-.60	40-44
2' x 2' x 5/8"	SLT	52704	.50-.60	35-39	50704	.50-.60	35-39
2' x 2' x 3/4"	SLT	50230	.55-.65	35-39	50052	.55-.65	35-39
2' x 4' x 5/8"	SLT	52705	.50-.60	35-39	50705	.55-.65	35-39
2' x 2' x 5/8"	ILT	52707	.50-.60	35-39	3384	.55-.65	35-39
2' x 2' x 3/4"	ILT	55702	.50-.60	35-39	55707	.55-.65	35-39

Tile

12" x 12" x 5/8"	Bevel Edge/Kerf	50120	.55-.65	35-39	N/A	—	—
12" x 12" x 3/4"	Bevel Edge/Kerf	50210	.60-.70	35-39	N/A	—	—
12" x 12" x 5/8"	Tongue & Groove Flange	50092	.55-.65	35-39	N/A	—	—

(1) For edge drawings, see page 40.

(2) Tile available in white; also see sales representative for availability of specific colors.

Omni Fissured

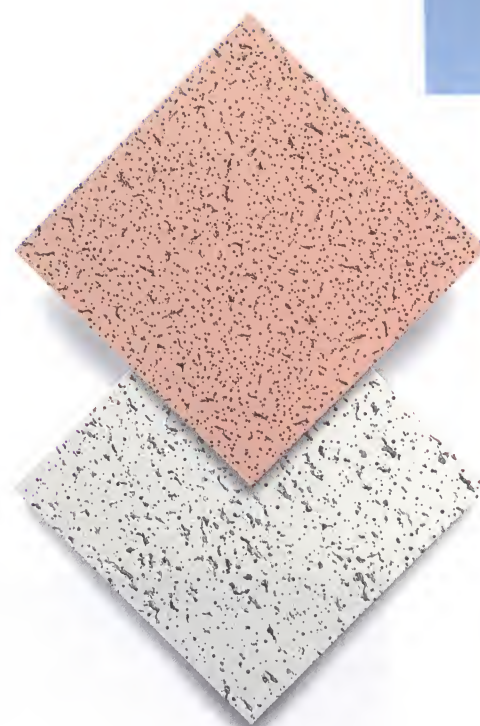
Natural Fissured II

Omni Fissured

Colors—White plus 24 colors²

Natural Fissured II

Color—White



Recommended Suspensions

Square edge panels

- DX, DXL

- CENTRICITEE

- MERIDIAN

SLT edge panels

- DX, DXL

ILT edge panels

- CENTRICITEE

- MERIDIAN

Fineline edge panels

- FINELINE

- Highline

Bevel Edge/Kerf tile

- DX Concealed

Fine Fissured

Corona

Fine Fissured

Colors—White plus 24 colors²

Corona

Colors—White plus 24 colors²

Fine Fissured panels/ FINELINE suspension

Two exceptionally light fissured patterns, designed to blend with any decorating style.

- Fine Fissured: finest fissures and perforations
- Corona: clean, crisp nondirectional fissures

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

FINE FISSURED

Panels

2' x 2' x 3/4"	Square	3621	.50-.60	40-44	3631	.55-.65	40-44
2' x 4' x 3/4"	Square	3620	.50-.60	40-44	3630	.55-.65	40-44
2' x 5' x 3/4"	Square	3627	.55-.65	35-39	3637	.55-.65	35-39
2' x 2' x 3/4"	SLT	3622	.55-.65	35-39	3632	.55-.65	35-39
2' x 4' x 3/4"	SLT	3623	.55-.65	35-39	3633	.55-.65	35-39
2' x 2' x 3/4"	ILT	3628	.55-.65	35-39	3638	.55-.65	35-39
2' x 2' x 3/4"	Fineline	3354	.55-.65	35-39	3394	.55-.65	35-39
2' x 2' x 3/4"	Geometrix	3629	.55-.65	35-39	N/A	—	—

Tile

12" x 12" x 3/4"	Bevel Edge/Kerf	3626	.50-.60	40-44	3636	.50-.60	40-44
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CORONA

Panels

2' x 2' x 5/8"	Square	392	.50-.60	35-39	397	.55-.65	40-44
2' x 4' x 5/8"	Square	391	.50-.60	35-39	398	.55-.65	40-44
2' x 2' x 5/8"	SLT	352	.55-.65	35-39	355	.50-.60	35-39
2' x 4' x 5/8"	SLT	351	.55-.65	35-39	356	.50-.60	35-39
2' x 2' x 5/8"	ILT	353	.50-.60	35-39	373	.55-.65	35-39
2' x 4' x 5/8"	ILT	354	.50-.60	35-39	374	.55-.65	35-39
2' x 2' x 5/8"	Fineline	5552	.55-.65	35-39	5752	.55-.65	35-39
2' x 4' x 5/8"	Fineline	5553	.55-.65	35-39	5753	.55-.65	35-39

Tile

12" x 12" x 3/4"	Bevel Edge/Kerf	720	.50-.60	40-44	720	.50-.60	40-44
12" x 12" x 5/8"	Bevel Edge/Kerf	730	—	—	930	—	—

(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

Recommended

Suspensions

Square edge panels

- DX, DXL
- CENTRICITEE
- MERIDIAN

SLT edge panels

- DX, DXL

ILT edge panels

- CENTRICITEE
- MERIDIAN

Fineline edge panels

- FINELINE
- Highline

Geometrix edge panels

- Geometrix
- Bevel Edge/Kerf Tile
- DX Concealed

Directional fissured panels and tile that provide balanced sound control. Designed for use where a subtle pattern of fissuring is desired.

- Fissured: directional fissures combined with random perforations

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

FISSURED

Panels

2' x 2' x 5/8"	Square	560	.50-.60	35-39	585	.50-.60	35-39
2' x 2' x 3/4"	Square	359	.60-.70	35-39	387	.60-.70	35-39
2' x 4' x 5/8"	Square	562	.50-.60	35-39	586	.50-.60	40-44
2' x 4' x 3/4"	Square	361	.60-.70	35-39	388	.60-.70	35-39
2' x 2' x 5/8"	SLT	506	.50-.60	35-39	517	.50-.60	35-39
2' x 2' x 3/4"	SLT	312	.55-.65	35-39	386	.50-.60	35-39
2' x 4' x 5/8"	SLT	507	.60-.70	35-39	518	.60-.70	35-39
2' x 4' x 3/4"	SLT	313	.60-.70	35-39	385	.60-.70	35-39
2' x 2' x 5/8"	ILT	50172	.50-.60	35-39	3388	.60-.70	35-39

Tile

12" x 12" x 5/16"	Staple Flange	500	.40-.50	N/A	N/A	—	—
12" x 12" x 5/8"	Bevel Edge/Kerf	504	.50-.60	40-44	515	.55-.65	45-49
12" x 12" x 3/4"	Bevel Edge/Kerf	304	.60-.70	40-44	317	.50-.60	45-49

(1) For edge drawings, see page 40.

Fissured



Fissured

Color—White

Recommended Suspensions

Square edge panels

- DX, DXL
- CENTRICITEE
- MERIDIAN

SLT edge panels

- DX, DXL

ILT edge panels

- CENTRICITEE
- MERIDIAN

Bevel Edge/Kerf tile

- DX Concealed

Pin-Perforated II

Pin-Perforated

Nordic

Pebbled

Perforated patterns that combine versatile appearance with superb sound control. Used for understated, efficient acoustical ceilings.

- Pin-Perforated II Panels: random fine and coarse perforations
- Pin-Perforated Tile: random perforations
- Nordic: smoothly pebbled, perforated surface
- Pebbled: granular, perforated surface

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

PIN-PERFORATED II

Panels

2' x 2' x 5/8"	Square	462	.60-.70	35-39	472	.60-.70	35-39
2' x 4' x 5/8"	Square	464	.60-.70	35-39	474	.60-.70	35-39

PIN-PERFORATED

Tile

12" x 12" x 5/8"	Bevel Edge/Kerf	501	.50-.60	45-49	514	.50-.60	40-44
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NORDIC

Panels

2' x 2' x 5/8"	Square	572	.50-.60	35-39	595	.50-.60	40-44
2' x 4' x 5/8"	Square	574	.50-.60	35-39	596	.50-.60	40-44
2' x 2' x 5/8"	SLT	523	.50-.60	35-39	N/A	—	—
2' x 4' x 5/8"	SLT	524	.50-.60	35-39	N/A	—	—

Tile

12" x 12" x 5/8"	Bevel Edge/Kerf	525	.55-.65	40-44	N/A	—	—
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PEBBLED

Panels

2' x 2' x 5/8"	Square	56584	.50-.60	35-39	56441	.50-.60	35-39
2' x 4' x 5/8"	Square	56581	.50-.60	35-39	56498	.50-.60	35-39

(1) For edge drawings, see page 40.

Pin Perforated II

Color—White

Pin Perforated

Color—White

Nordic

Color—White

Pebbled

Color—White

Recommended Suspensions

- Square edge panels
 - DX, DXL
 - CENTRICITEE
 - MERIDIAN
- SLT edge panels
 - DX
- Bevel Edge/Kerf tile
 - DX Concealed



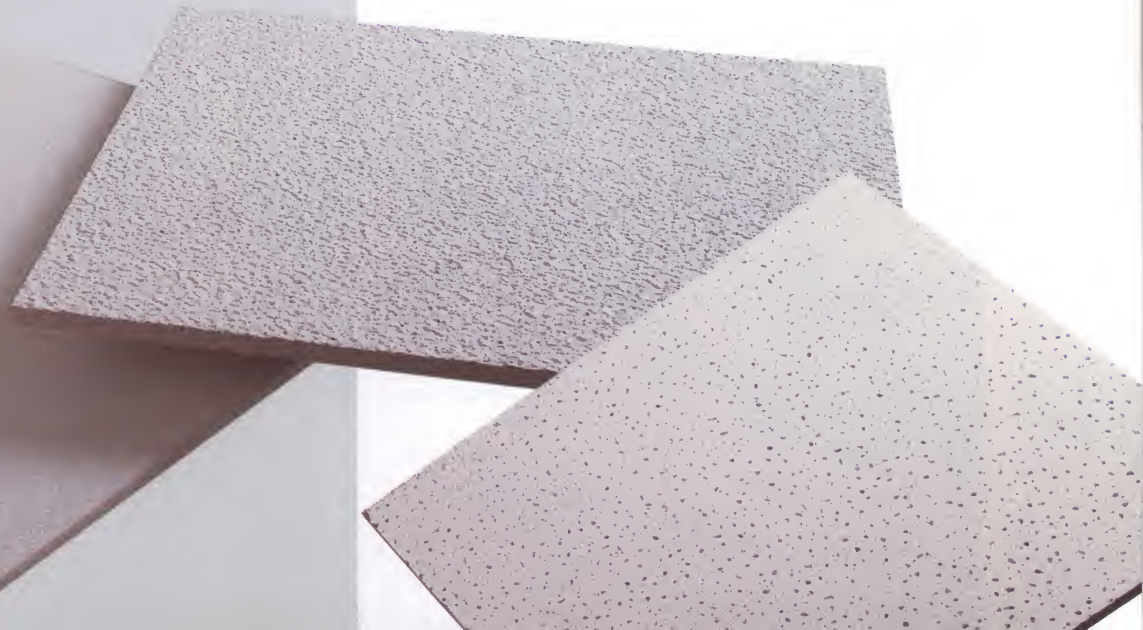
AURATONE SPECIAL FUNCTION

PANELS AND TILE Extra performance to meet strict environmental requirements.

ROCK FACE® and **IMPACTION®** System panels and retention clips withstand direct contact.

PREMIER glass fiber ceilings offer great sound absorption. **GLIP** and **CLEAN ROOM** panels resist fiber infiltration in food-processing areas and clean rooms. **METAL FACE**, **SUPER-E**, and **CERAMIC HERITAGE** panels are designed for hot, humid environments.

Surface burning characteristics (flame spread/smoke developed) are 15/10 for **ROCK FACE**, 15/0 for **GLIP** panels, 25/45 for **CLEAN ROOM** and **METAL FACE**, 0/0 for **CERAMIC HERITAGE**, and 25/10 for all other nonglass special function panels. Thermal resistance R-factors for nonglass panels (at 75°F mean temperature) are 1.85 for all 5/8"-thick panels and 2.18 for all 3/4"-thick panels.



ROCK FACE Panels

IMPACTION System



ROCK FACE

Color—White

IMPACTION

Color—White

Recommended Suspensions³

Square and SLT edge panels

- DX, DXL
- ZXA, ZXLA
- Bevel Edge/Kerf tile
- DX Concealed

ABUSE RESISTANT

Ceiling panels of specially compounded surface, texture and formulation provide high resistance to humidity, blows and scuffs.

Gardner impact-tested to 20-25"-lb. without visible damage. Ball-hardness tested (ASTM C367) to 150 lb.⁽¹⁾

- **ROCK FACE** panels: hard core, granular textured surface. Supports insulation weight up to .75 lb./ft.²
- **IMPACTION** System: look-alike panel plus flexible retention clips, totally compatible with ROCK FACE panels in mixed use. Resistant to breaking, cracking or falling out.

Size	Edge ²	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

AURATONE ROCK FACE PANELS

Panels

2' x 2' x 5/8"	Square	N/A	—	—	56335	.40-.50	35-39
2' x 2' x 3/4"	SLT	N/A	—	—	55483	.50-.60	35-39
2' x 4' x 5/8"	Square	N/A	—	—	56380	.55-.65	35-39

Tile

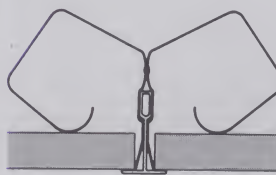
12" x 12" x 3/4"	Bevel Edge/Kerf	N/A	—	—	55385	.65-.75	40-44
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IMPACTION SYSTEM

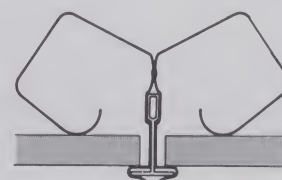
Panels

2' x 2' x 3/4"	Square	N/A	—	—	56901	.60-.70	35-39
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- (1) Ball-hardness tested to 150 lb. for 1/4" depression by a 2" steel ball (2 retention clips attached to suspension grid for each panel).
- (2) For edge drawings, see page 40.
- (3) Suspension systems should suit high-humidity or corrosive environmental conditions if they exist. See Ceiling Suspension Systems, page 38.



ROCK FACE Panel Retention
Clip (Item #20428)



IMPACTION Spring Assembly
Clip (Item #20429, U.S.
Patent No. 3,834,106)

Retention and Impaction
Clips require 1 1/2" high grid members.

Cloth and vinyl faced glass fiber panels, for superb noise reduction.

- Nubby: fiberglass cloth pattern with a brushed canvas look
- HI-LITE: vinyl film in Twill and Kapok patterns

Size	Edge ¹	Regular			Foil Backing		
		Item No.	NRC Range	STC Range ³	Item No.	NRC Range	STC Range

PREMIER NUBBY

Panels

2' x 2' x 3/4"	Square	7000	G.80-.90	N/A	7010	G.85-.95	N/A
2' x 2' x 1"	Square	7002	G.85-.95	N/A	7012	G.90-1.00	N/A
2' x 2' x 1 1/2"	Square	7006	G.95-1.05	N/A	7015	G.95-1.05	N/A
2' x 4' x 3/4"	Square	7001	G.80-.90	N/A	7011	G.85-.95	20-24
2' x 4' x 1"	Square	7003	G.85-.95	N/A	7013	G.90-1.00	20-24
2' x 4' x 1 1/2"	Square	7007	G.95-1.05	N/A	7016	G.95-1.05	30-34
4' x 4' x 1"	Square	7004	G.85-.95	N/A	7014	G.90-1.00	N/A
4' x 8' x 1"	Square	7005	G.85-.95	N/A	N/A	—	—
30" x 30" x 1"	Square	7020	G.85-.95	N/A	N/A	—	—
2' x 2' x 1 1/2"	Shadowline ²	7026	G.95-1.05	N/A	7030	G.95-1.05	30-34
2' x 2' x 1 1/2"	Fineline ²	7027	G.95-1.05	N/A	N/A	—	—

Size	Edge ¹	Perforated			Unperforated		
		Item No.	NRC Range	STC Range ⁴	Item No.	NRC Range	STC Range

PREMIER HI-LITE

Twill Panels

5/8" x 2' x 2'	Square	7050	G.65-.75	N/A	7052	GN/A	N/A
5/8" x 2' x 4'	Square	7051	G.65-.75	N/A	7053	G.50-.60	N/A
1" x 2' x 2'	Square	7060	G.80-.90	N/A	N/A	—	—
1" x 2' x 4'	Square	7061	G.80-.90	N/A	N/A	—	—
1" x 4' x 4'	Square	7062	G.80-.90	N/A	N/A	—	—

Kapok Panels

5/8" x 2' x 2'	Square	7054	G.65-.75	N/A	7056	GN/A	N/A
5/8" x 2' x 4'	Square	7055	G.65-.75	N/A	7057	GN/A	N/A

(1) For edge drawings, see page 40.

(2) Painted edges.

(3) Panels without backing attain an STC range of 15-19.

Recommended Suspensions

Square edge panels

- DX
- CENTRICITEE
- MERIDIAN

Shadowline edge panels

- DX

Fineline edge panels

- CENTRICITEE
- MERIDIAN
- FINELINE
- Highline

Nubby

HI-LITE

Nubby

Color—White

Twill

Color—White

Kapok

Color—White

Nubby panels/DX suspension



GLIP Ceiling Panels

Tough, washable, inexpensive ceilings for interior and exterior applications. USDA acceptance for food processing areas. GLIP gypsum lay-in panels have tough gypsum panel core, fire resistance at no extra cost.

- White vinyl facing: stipple pattern, 2-mil-thick vinyl is easily washable, offers grade LR 1 light reflectance
- Unfinished paper facing: natural color paper facing, for economical utility applications

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

STIPPLE PATTERN

Panels

2' x 2' x 1/2"	Square	N/A	—	—	3260	N/A	45-49
2' x 4' x 1/2"	Square	N/A	—	—	3270	N/A	45-49

UNFINISHED PAPER FACING

Panels

2' x 2' x 1/2"	Square	N/A	—	—	3440	N/A	45-49
2' x 4' x 1/2"	Square	N/A	—	—	3450	N/A	45-49

(1) For edge drawings, see page 40.

Stipple Pattern

Color—White

Unfinished Paper

Natural color paper

GLIP panels, stipple pattern/DXLA suspension

Recommended Suspensions

Square edge panels

- DXL, DXLA
- ZXA, ZXLA
- CENTRICITEE
- MERIDIAN



Tough, fire-resistant panels for high-tech clean rooms. Sealed edges and special back coating control airborne particles to meet stringent requirements. Offers grade LR 1 light reflectance, meets Federal Standard 209D and high standards for hospitals, laboratories and computer rooms. Superior accessibility and washability, corrosion resistance and freeze/thaw-resistance.

- CLEAN ROOM Class 100: impervious surface of white-vinyl coated aluminum foil¹
- CLEAN ROOM Class 10,000-100,000: perforated, white-vinyl coated aluminum foil surface¹

Size	Edge ²	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

CLEAN ROOM CLASS 100

Panels

2' x 4' x 5/8"	Square	N/A	—	—	56091	N/A	40-44
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CLEAN ROOM CLASS 10M-100M

Panels

2' x 4' x 5/8"	Square	N/A	—	—	56090	.50-.60	40-44
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(1) Panel face is foil; edges are painted.

(2) For edge drawings, see page 40.

CLEAN ROOM Class 100

CLEAN ROOM Class 10,000-100,000

Class 100

Color—White

Class 10M-100M

Color—White



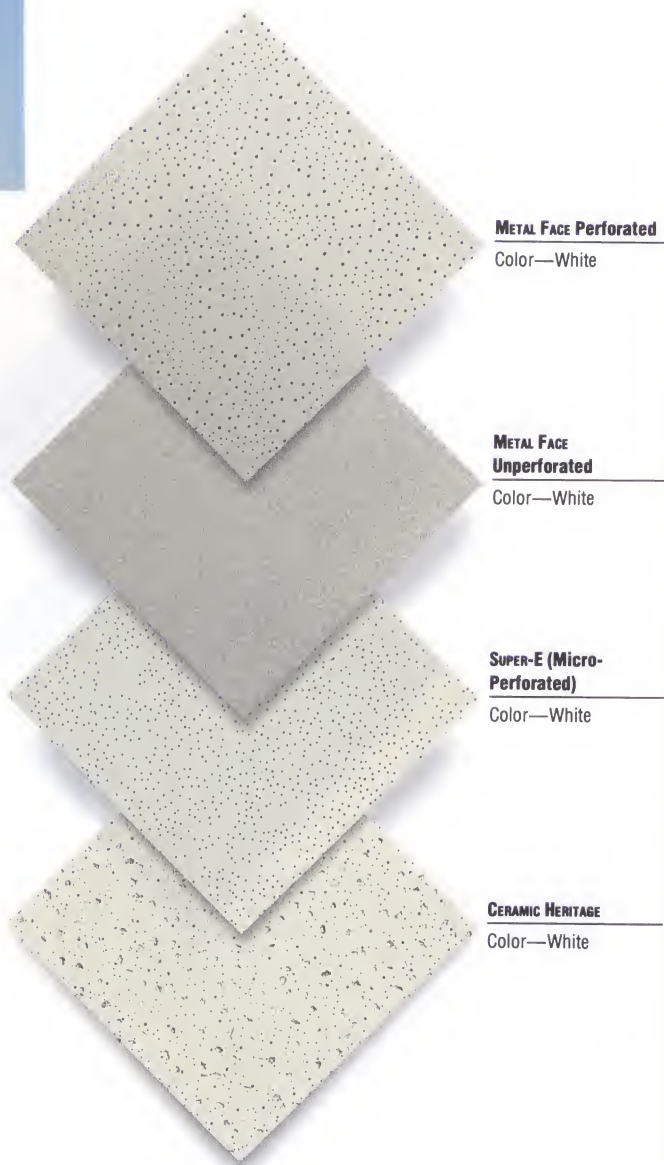
Recommended Suspensions

- Square edge panels
- DX, DXL, DXLA
 - ZXA, ZXLA

METAL FACE

SUPER-E

CERAMIC HERITAGE



METAL FACE Unperforated: USDA-accepted for food preparation areas

SUPER-E: Resists objectionable sag with up to 3.5 lb/ft² superimposed load, also resists corrosive chlorine vapors. Unperforated panels are USDA-accepted for food preparation areas.

CERAMIC HERITAGE: Gardner scrubbability-tested finish meets 1,000 cycles. Exclusive "ceiling zero" surface burning characteristics. Approved by U.S. Coast Guard (No. 164,009/212/0) for demanding service on merchant ships.

Three special FIRECODE formulations that meet strict environmental requirements.

- **METAL FACE:** embossed aluminum surface, white-vinyl coated. Offers extra resistance to corrosion, soiling, humidity, chlorine vapors and sag. Gardner scrubbability-tested finish to 5,000 cycles.
- **SUPER-E:** foil face and back. Designed to withstand ambient temperatures/humidities up to 90°F/90% R.H.
- **CERAMIC HERITAGE:** 100% ceramic-bonded mineral fiber, formulated for strength and durability. Withstands high heat, humidity or corrosive chemical fumes: tested successfully in live-steam temperatures of up to 275°F.

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

METAL FACE (PERFORATED)**Panels**

2' x 2' x 5/8"	Square	N/A	—	—	56092	.50-.60	40-44
2' x 4' x 5/8"	Square	N/A	—	—	56096	.55-.65	40-44

METAL FACE (UNPERFORATED)**Panels**

2' x 2' x 5/8"	Square	N/A	—	—	56093	N/A	40-44
2' x 4' x 5/8"	Square	N/A	—	—	56094	N/A	40-44

SUPER-E (MICRO-PERFORATED)**Panels**

2' x 2' x 5/8"	Square	N/A	—	—	672	.50-.60	40-44
2' x 4' x 5/8"	Square	N/A	—	—	675	.50-.60	40-44

SUPER-E (UNPERFORATED)**Panels**

2' x 4' x 5/8"	Square	N/A	—	—	5405	—	40-44
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CERAMIC HERITAGE**Panels**

2' x 4' x 5/8"	Square	N/A	—	—	56645	.35-.45	40-44
2' x 2' x 5/8"	Square	N/A	—	—	56644	.35-.45	40-44

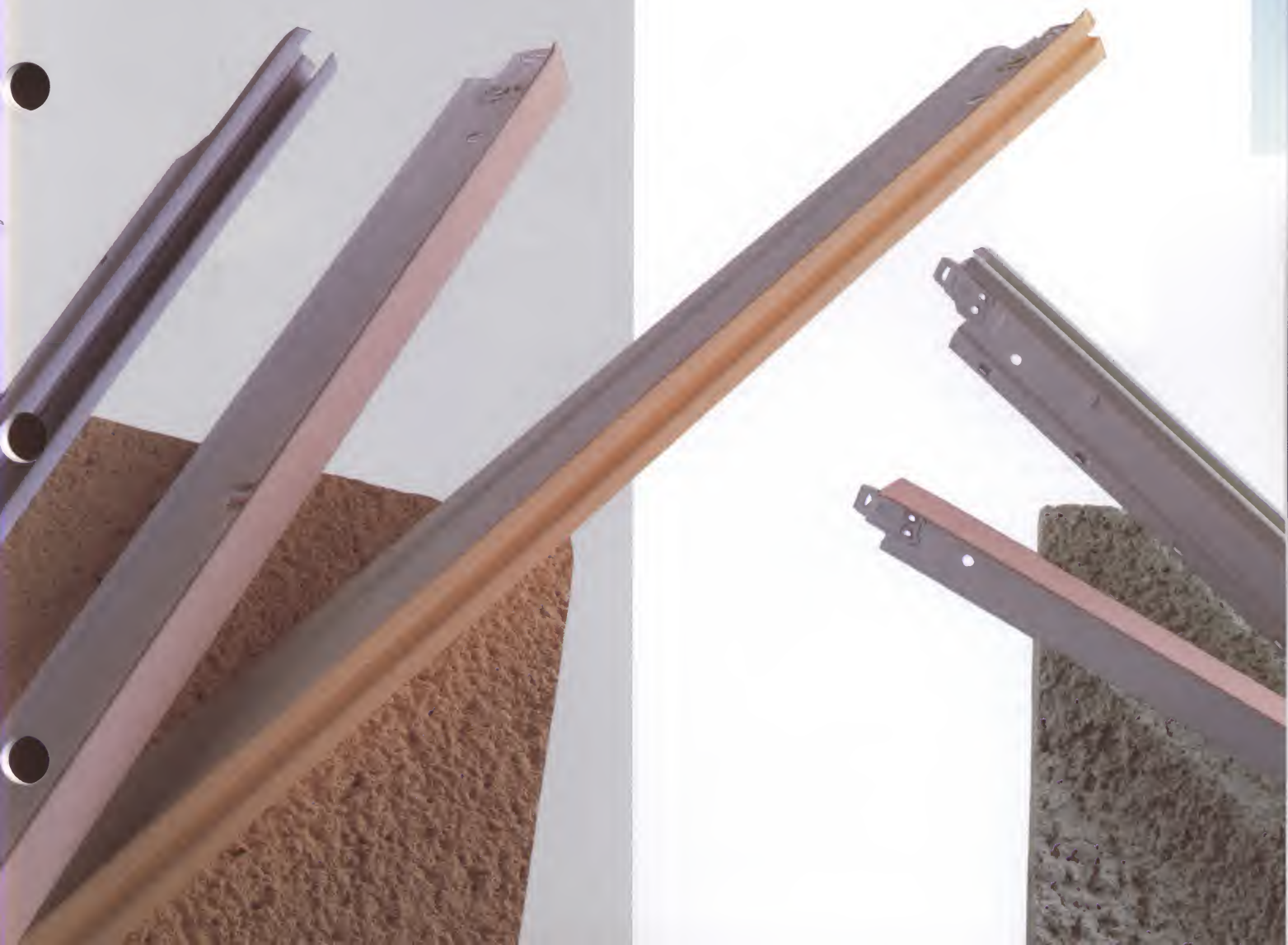
(1) For edge drawings, see page 40.

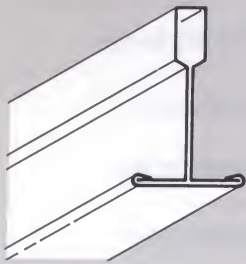
**EXPOSED AND CONCEALED GRID
SYSTEMS FOR ACOUSTICAL PANELS
AND TILE**

USG Interiors, Inc. offers the complete line of DONN brand suspension systems for acoustical ceilings. DONN suspension systems are available in intermediate-duty and heavy-duty as well as fire-rated designs. Most systems come in 24 standard colors (color coordinated with ACOUSTONE and AURATONE panels), and contrasting woodgrain, metallic and other finishes. Custom colors are also available. All

DONN systems are designed for esthetics, strength and fast, simple installation.

For detailed information, including specifications, fire-rated designs, and complete technical data, request the USG Interiors Ceiling Suspension Systems catalog, or refer to it in Section 09120 of Sweet's Facility Interiors & Renovation File and General Building and Renovation File.

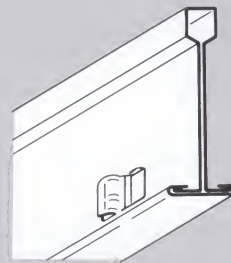




DX

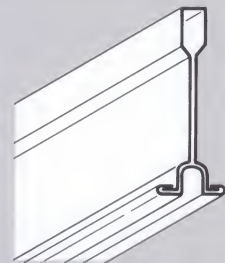
- The most widely used acoustical suspension system
- Maximum economy, simplicity, and access in an exposed grid system
- Meets or exceeds all national code requirements, including seismic
- Intermediate- or heavy-duty main tee ratings
- Available in 24 colors
- Accepts ACOUSTONE Square and Shadowline edge panels, AURATONE Square, Shadowline

- Tapered and Prisms edge panels, GLIP panels
- DXL: Fire-rated systems with more than 60 designs to 3 hr.—with all the standard DX advantages
 - DXLA: Fire-rated system of steel components with corrosion-resistant aluminum cap on exposed surfaces
 - DXW: All the features of 1 $\frac{5}{16}$ " DX grid with a 1 $\frac{1}{2}$ " exposed face



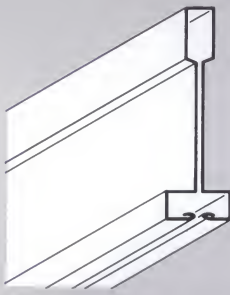
CENTRICITEE

- Subtle visual effect from a narrow line exposed grid system
- First 2-hour fire-rated $\frac{1}{16}$ " grid
- Patented, automatic panel-centering device
- Meets or exceeds all national code requirements, including seismic
- Available in 24 colors
- Accepts ACOUSTONE Square and Fineline edge panels, AURATONE Square, Interline Tapered edge panels, GLIP panels



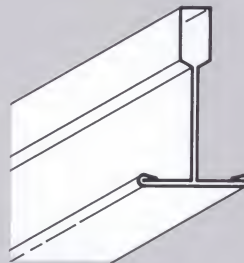
MERIDIAN

- Combines esthetics of more expensive screw-slot grid with the function and utility of exposed grid
- Unique, rounded $\frac{5}{32}$ " reveal softens effect of the grid lines and enhances finished installation
- Automatic centering of panels and light fixtures
- Available in 24 colors
- Accepts ACOUSTONE Square and Fineline edge panels, AURATONE Square, Interline Tapered edge panels, GLIP panels



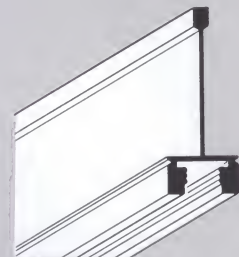
Geometrix

- Suspension system with all the advantages of a DX clip
- Exceptionally finely-crafted appearance from an exposed grid and panel system
- $\frac{1}{8}$ " reveal, mitered corners for a clean, finished look
- Creates intriguing designs with patterns on the Geometrix panels
- Accepts Fine Fissured Geometrix edge panels, also other ACOUSTONE and AURATONE panels on special order
- For more information on this product, contact your USG Interiors sales representative



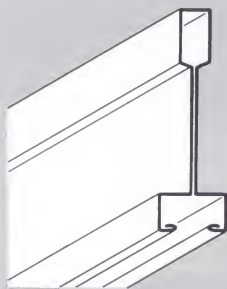
DX Concealed Grid

- Supporting grid can be completely concealed, providing a monolithic appearance
- Four systems available to accommodate a variety of access requirements
- Light fixtures, air diffusers, and plenum access can be arranged with great flexibility
- Fire-rated assemblies available
- Accepts ACOUSTONE Square Edge/Kerf, Bevel Edge/Kerf, Chex/9 edge tile, AURATONE Bevel Edge/Kerf tile



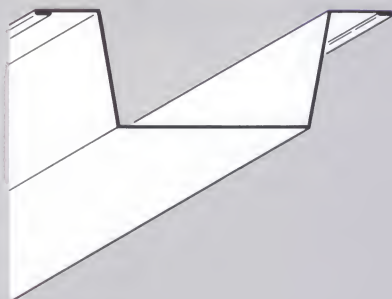
Highline

- Narrow-faced extruded aluminum screw-slot grid
- Smooth, medium, and heavy textures available, including the option of a contrasting black reveal
- Provides an uninterrupted reveal for a trim, finished appearance
- Accepts ACOUSTONE and AURATONE Fineline edge panels



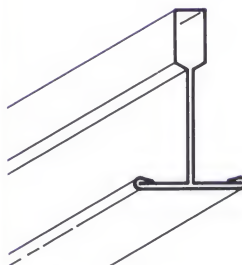
FINELINE

- Innovative, narrow profile, slotted ceiling grid
- Mitered corners offer a clean, crisp, finished appearance
- DONN brand air diffuser assemblies integrate with grid and panels for a clean, uninterrupted ceiling plane
- Cost savings from fast assembly, choice of module sizes and standard fixtures
- Available in 24 colors
- Available in all white or white with black reveal
- Intermediate- or heavy-duty main tee classification
- Fire-rated assemblies available
- Accepts ACOUSTONE and AURATONE Fineline edge panels



RIGID X

- Ideal for screw attaching SHEETROCK brand gypsum panels
- Accepts standard lay-in light fixtures and air diffusers
- Many fire-rated designs
- Quickly installed with modular components
- Knurled face on furring channels and furring cross tees
- Combines the installation speed of grid and the durability of black iron furring channel systems into one unique system
- Heavy-duty construction



Environmental Grid Systems

- Ideal for high humidity areas
- ZXA: double webbed galvanized steel body with painted aluminum cap and stainless steel DX clips; strength exceeds comparable aluminum systems
- ZXLA: fire-rated, accepted in all DXLA designs
- AX: double-webbed all aluminum grid with stainless steel DX clips; cross tees with offset ends rest on main tees without sagging, twisting
- Accepts ACOUSTONE Square and Shadowline edge, AURATONE Square, Shadowline Tapered and Prisms edge panels, GLIP panels

DX, DXL, DXLA, DXW

CENTRICITEE

MERIDIAN

FINELINE

Geometrix

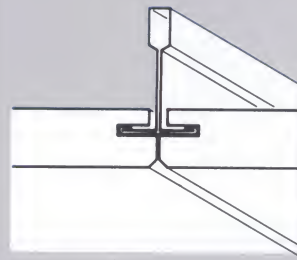
Highline

DX Concealed Grid

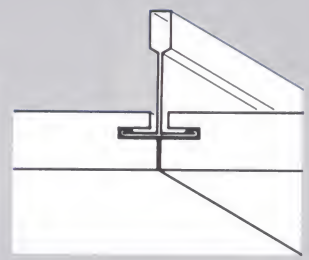
RIGID X®

Environmental Grid Systems

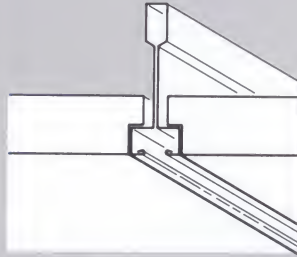
This Selection Chart illustrates compatible ceiling suspension grids and panel edges.



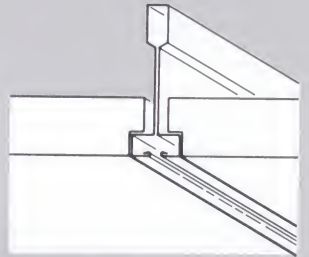
**Bevel Edge Tile
DX Concealed Grid**



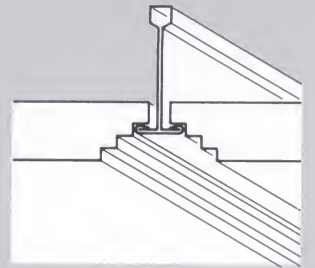
**Square Edge Tile
DX Concealed Grid**



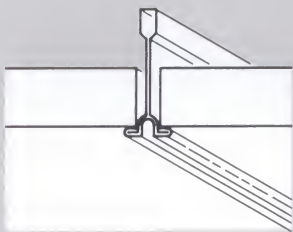
**Fineline Panel
Fineline Grid**



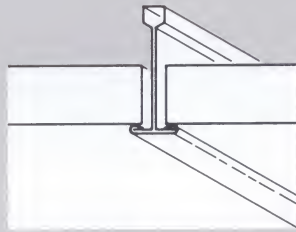
**Geometrix Panel
Geometrix Grid**



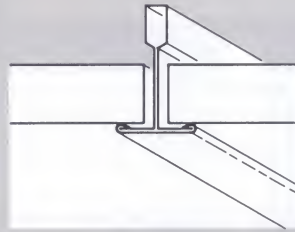
**Pedestals Panel
Centricitee Grid**



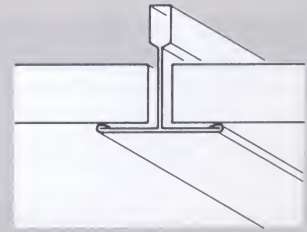
**Square Edge Panel
Meridian Grid**



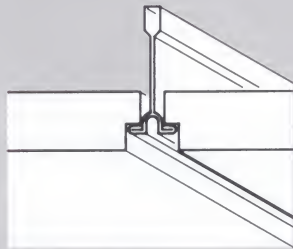
**Square Edge Panel
Centricitee Grid**



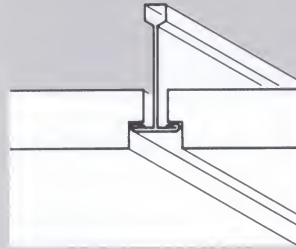
**Square Edge Panel
DX Grid**



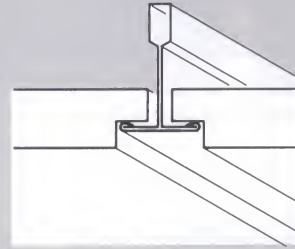
**Square Edge Panel
DXW Grid**



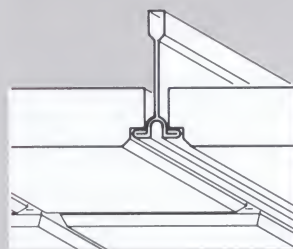
**Fineline Panel
Meridian Grid**



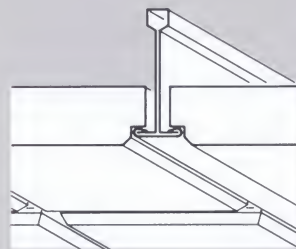
**Fineline Panel
Centricitee Grid**



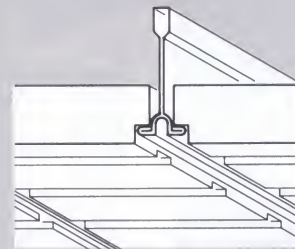
**Shadowline Panel
DX Grid**



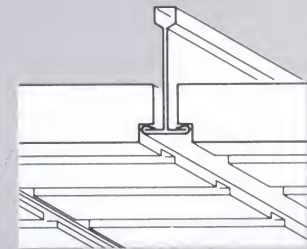
**Chex/16 Panel
Meridian Grid**



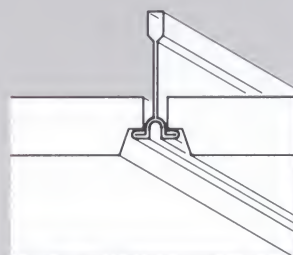
**Chex/16 Panel
Centricitee Grid**



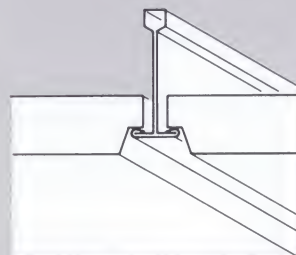
**Checkmate Panel
Meridian Grid**



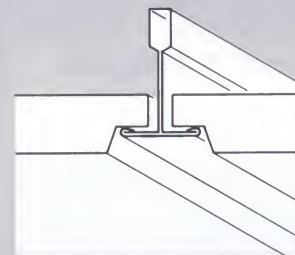
**Checkmate Panel
Centricitee Grid**



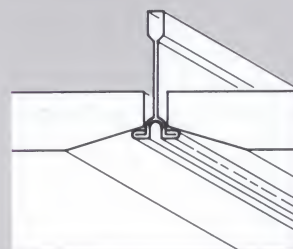
**Interline Tapered Panel
Meridian Grid**



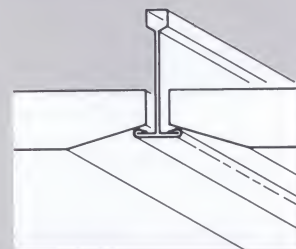
**Interline Tapered Panel
Centricitee Grid**



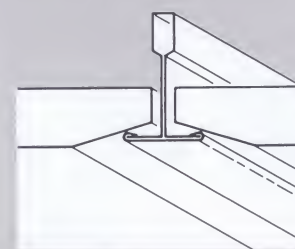
**Shadowline Tapered Panel
DX Grid**



**Prisms Panel
Meridian Grid**



**Prisms Panel
Centricitee Grid**



**Prisms Panel
DX Grid**

INTEGRATED CEILINGS SPECIALTY PRODUCTS

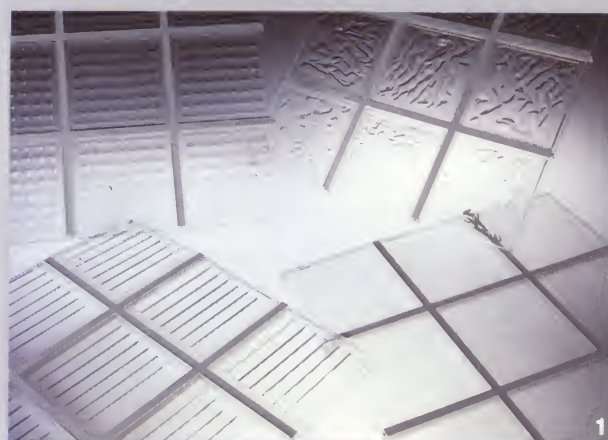
This complete line of innovative ceilings features materials, patterns, textures and colors that bring a new level of visual excitement to interior space. These specialty products offer the creativity and flexibility of custom ceilings with the convenience of commodity products.

INTEGRATED CEILINGS come to the jobsite pre-engineered, fitted, painted and ready for assembly. Luminous skylights, reflective and fabric-wrapped surfaces, open plenum treatments and acoustical linear metal are just some of the possibilities. Specialty materials include acrylic "glass block" panels and pressed metal panels.

For more information, refer to SA-906, INTEGRATED CEILINGS Specialty Products, in section 09500 of Sweet's Facility Interiors & Renovation File and General Building and Renovation File. Or call 1-800-950-3859.



LUMINOUS AND REFLECTIVE CEILINGS



1. TRANSPARENCIES™ Ceilings

The same subtly refracted light play as traditional glass blocks, but with just a fraction of the weight, cost, and installation difficulties of glass.



2. SKYFRAME™ Ceilings

The feeling of traditional skylights, providing the warmth and brightness of natural daylight.

3. CELEBRATION™ Ceilings

Sophisticated, mirror-like CELEBRATION ceilings are dramatically space extending. CELEBRATION panels are also available painted or fabric-covered.



4. MIRRAPLANE® Ceilings

Premium grade, highly polished stainless steel MIRRAPLANE ceilings present an almost seamless mirrored plane.

5. VISTA SONIC™ Ceilings

An exclusive combination of sound absorption and reflective finish.

LINEAR METAL CEILINGS

6. PARALINE® Ceilings

Elegant, imaginative linear metal ceilings, ideal for expansive areas.

7. LINEA® Ceilings Roll-formed aluminum baffles create a one-directional open-plenum linear ceiling.



SILENT COLLECTION WALLS AND CEILINGS

8. SILENT EXPRESSIONS™

Ceilings Custom-embossed panels can express a company logo or other image; or four standard designs can be selected.



9. SILENT 65 and SILENT 95 Walls

Beautiful wall panels with mineral fiber and glass fiber substrates absorb up to 65 percent and 95 percent of sound respectively.



10. SILENT SQUARES® Ceilings

An exclusive combination of luxury and efficient sound control.



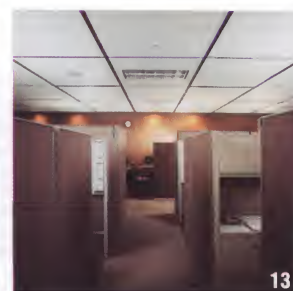
INTEGRATED PANEL/GRID SYSTEMS

11. INTERSECTIONS™ Ceiling

System Installed at an 11½° angle to the perimeter of the space, this unique system breaks away from the conventional look of rectilinear ceilings.



12. IMPRINTS™ Ceilings The art of pressed metal ceiling design for contemporary settings.



13. DOWN COORDINATOR® Ceilings Utilities and services can be incorporated into the runners to eliminate special fixtures.

Product Description ^(A)				Sound Absorption Test Data ^(B)			
Product Line Type	Pattern	Item No.	Size	STC Range	Mounting ^(C)	NRC Range	Mounting
ORION Panels	ORION 210	64111	1/2"x2"x4"	25-29	CE	.75-.85	E400
	ORION 270	63171	1"x2"x4"	25-29	CE	.90-1.00	E400
	ORION 270	61175	3/4"x2"x4"	35-39	CE	.80-.90	E400
Backed ORION Panels	ORION 210	68118	3/4"x2"x4"	25-29	CE	.70-.80	E400
	ORION 270	68178	3/4"x2"x4"	25-29	CE	.78-.80	E400
ACOUSTONE Tile & Panels	Chex/9	409	3/4"x12"x12"	25-29	CCF	.70-.80	E400
	GLACIER	701	3/4"x12"x12"	25-29	CCF	.70-.80	E400
				20-24	ICF	—	—
	"F" Fissured	101	3/4"x12"x12"	50-54	Ad ⁽²⁾	.65-.75	B
				25-29	ICF	.65-.75	E400
Foil-Backed ACOUSTONE Tile & Panels	Chex/16	416	3/4"x24"x24"	40-44	CE ^(4,6)	.60-.70	E400
	Checkmate	432	3/4"x24"x24"	40-44	CE ^(4,6)	.55-.65	E400
	GLACIER	707	3/4"x24"x24"	40-44	CE ^(3,6)	.70-.80	E400
				40-44	CEd ⁽³⁾	—	—
	Finesse	790	3/4"x12"x12"	35-39	CCF	.75-.85	E400
	"F" Fissured	132	3/4"x24"x24"	—	—	.70-.80	E400
				40-44	CE ^(3,6)	—	—
				40-44	CE ^(5,6)	—	—
		135	3/4"x24"x48"	35-39	CE	.65-.75	E405
	Frost	414	3/4"x24"x24"	35-39	CE ^(3,6)	.65-.75	E400
	GLACIER	715	3/4"x24"x24"	35-39	CE ⁽³⁾	.70-.80	E400
		713	—	—	—	.75-.85	E400
ACOUSTONE FIRECODE Tile & Panels	"F" Fissured	138	3/4"x12"x12"	35-39	CCF	.70-.80	E400
		141	3/4"x24"x24"	40-44	CE ⁽³⁾	.65-.75	E400
				—	—	—	—
AURATONE Panels	Fissured	562	5/8"x24"x48"	35-39	CE	.50-.60	E400
				40-44	CEd	—	—
				40-44	CEt	—	—
		361	3/4"x24"x48"	35-39	CE	.60-.70	E400
				40-44	CEd	—	—
	Omni Fissured	323	5/8"x24"x24"	35-39	CE ^(3,6)	.50-.60	E400
		345	5/8"x24"x48"	35-39	CE	.50-.60	E405
		343	3/4"x24"x48"	40-44	CE	.60-.70	E400
	Hi-NRC Omni Fissured	3148	3/4"x24"x24"	35-39	CE ⁽³⁾	.65-.75	E400
		3178	3/4"x24"x48"	35-39	CE	.65-.75	E400
	Pin-Perf II	464	5/8"x24"x48"	35-39	CE	.60-.70	E400
		—	3/4"x24"x48"	35-39	CE	.60-.70	E400
	Nat. Fissured II	56705	5/8"x24"x48"	35-39	CE	.50-.60	E400
		52704	5/8"x24"x24"	35-39	CE ⁽³⁾	.50-.60	E400
	Pebbled	56581	5/8"x24"x48"	35-39	CE	.50-.60	E405
	Nordic	574	5/8"x24"x48"	35-39	CE	.50-.60	E405
	Surf	661	5/8"x24"x24"	35-39	CE	.50-.60	E400
		665	5/8"x24"x48"	35-39	CE	.55-.65	E400
	Aspen	650	3/4"x24"x24"	35-39	CE ⁽⁶⁾	.55-.65	E400
	Tahoe	633	5/8"x24"x48"	35-39	CE	.50-.60	E400
		630	3/4"x24"x24"	35-39	CE ⁽⁶⁾	.50-.60	E400
	Eight/12 (ILLUSION Clg. Two/24 Ser.—Omni F.)	3370	3/4"x24"x48"	40-44	CE	.55-.65	E400
		3575	—	40-44	CE	.55-.65	E400
	Eight/12 (ILLUSION Clg. Two/24 Ser.—Aspen)	654	3/4"x24"x48"	40-44	CE ⁽⁶⁾	.55-.65	E400
		652	—	40-44	CE ⁽⁶⁾	.55-.65	E400
	Aurora	55620	3/4"x24"x24"	40-44	CE ⁽³⁾	.45-.55	E405
AURATONE FIRECODE Panels	Fissured	586	5/8"x24"x48"	40-44	CE	.50-.60	E400
	Omni Fissured	339	5/8"x24"x48"	40-44	CE	.50-.60	E400
	Pin-Perf II	474	5/8"x24"x48"	35-39	CE	.60-.70	E400
	Nat. Fissured II	56765	5/8"x24"x48"	40-44	CE	.50-.60	E400
	Nordic	596	5/8"x24"x48"	40-44	CE	.50-.60	E405
	Pebbled	56498	5/8"x24"x48"	35-39	CE	.50-.60	E400
	SUPER-E	675	5/8"x24"x48"	40-44	CE	.50-.60	E400
	Surf	667	5/8"x24"x24"	35-39	CE	.55-.65	E400
		669	5/8"x24"x48"	35-39	CE	.60-.70	E400
	Aspen	3845	3/4"x24"x24"	35-39	CE ⁽³⁾	.60-.70	E400
	ROCK FACE	56380	5/8"x24"x48"	35-39	CE	.55-.65	E400
	METAL FACE	56096	5/8"x24"x48"	40-44	CE	.55-.65	E400
	CLEAN ROOM (perf)	56090	5/8"x24"x48"	40-44	CE	.55-.65	E400
	Aurora	50620	3/4"x24"x24"	40-44	CE ⁽³⁾	.45-.55	E400
AURATONE Tile	Fissured	500	9/16"x12"x12"	—	—	.40-.50	D20
		504	5/8"x12"x12"	40-44	CCF	.50-.60	E405
		304	3/4"x12"x12"	40-44	CCF	.60-.70	E400
	Omni Fissured	320	5/8"x12"x12"	40-44	CCF	.50-.60	E400
		340	3/4"x12"x12"	45-49	CCF	.55-.65	E400
	Pin-Perf	501	5/8"x12"x12"	45-49	CCF	.50-.60	E405
	Nordic	525	5/8"x12"x12"	40-44	CCF	.55-.65	E405
	Surf	660	5/8"x12"x12"	40-44	CCF	.50-.60	E400
AURATONE FIRECODE Tile	Fissured	515	5/8"x12"x12"	45-49	CCF ⁽⁶⁾	.55-.65	E400
	Omni Fissured	335	5/8"x12"x12"	40-44	CCF	.55-.65	E400
	Surf	666	5/8"x12"x12"	40-44	CCF	.55-.65	E400
	Aurora	50441	5/8"x12"x12"	40-44	CCF ⁽⁶⁾	.55-.65	E400
GLIP Panels	GLIP Panels	3270	1/2"x24"x48"	45-59	CE	—	—

Coefficients							Product Page Reference
Band Center Frequency Hz	125	250	500	1000	2000	4000	
.69	.76	.65	.86	.83	.75	N/A	8
.74	.82	.82	1.05	1.06	1.09	N/A	8
.42	.43	.82	1.13	1.09	1.02	N/A	8
.60	.60	.71	.92	.80	.62	N/A	8
.49	.60	.61	.86	.94	1.04	N/A	8
.64	.60	.65	.77	.91	1.00	.77	14-15
.56	.67	.57	.80	.94	1.00	.70	12-13
—	—	—	—	—	—	—	—
.05	.23	.71	.97	.86	.93	—	16
.49	.53	.53	.75	.92	.99	.83	—
—	—	—	—	—	—	—	—
.22	.29	.66	.80	.83	.89	.81	14-15
.23	.25	.64	.77	.83	.80	.76	14-15
.37	.33	.61	1.00	.96	1.03	.67	—
—	—	—	—	—	—	—	—
.52	.40	.63	.85	.88	1.04	.83	16
.44	.33	.68	.98	1.02	1.03	.77	—
—	—	—	—	—	—	—	—
.29	.29	.62	.96	.95	.95	.69	—
.36	.31	.66	.90	.87	.81	.81	11
.34	.30	.62	1.00	.99	1.03	.67	12-13
.54	.54	.69	.99	.97	1.10	—	—
.52	.50	.67	.95	.94	.99	.82	16
.15	.26	.68	.93	.89	1.00	.77	—
.37	.31	.52	.84	.75	.62	.78	29
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
.34	.36	.71	.85	.68	.64	.77	—
—	—	—	—	—	—	—	—
.38	.32	.49	.72	.84	.91	.78	27
.40	.25	.52	.78	.84	.95	.79	—
.23	.33	.65	.80	.77	.76	—	—
.42	.51	.68	.85	.79	.78	.84	26
.45	.42	.71	.89	.74	.71	—	—
.26	.38	.69	.81	.69	.52	.77	30
.37	.40	.73	.81	.64	.61	.79	—
.33	.31	.46	.78	.88	.70	.80	27
.43	.32	.48	.65	.72	.73	.79	—
.28	.36	.51	.69	.66	.65	N/A	30
.22	.30	.49	.72	.59	.38	.78	30
.35	.35	.54	.73	.64	.57	.71	24
.41	.33	.60	.84	.69	.58	.74	—
.29	.37	.60	.73	.64	.66	.70	25
.35	.36	.56	.76	.57	.40	.79	25
.30	.38	.68	.67	.51	.45	.77	—
.31	.33	.54	.76	.74	.77	.77	22-23
.33	.30	.57	.75	.71	.77	.77	—
.27	.29	.59	.76	.72	.75	.73	22-23
.30	.32	.63	.78	.73	.76	.71	—
.29	.29	.44	.61	.72	.73	.66	25
.34	.30	.53	.78	.73	.69	—	29
.27	.29	.53	.74	.71	.68	.79	27
.37	.34	.60	.87	.82	.71	.80	30
.29	.29	.57	.74	.66	.58	.83	27
.22	.31	.55	.80	.59	.37	.77	30
.30	.35	.55	.77	.61	.47	.85	30
.20	.29	.64	.79	.55	.40	.83	36
.36	.39	.61	.76	.67	.63	.70	24
.39	.34	.63	.85	.69	.59	.74	—
.36	.35	.66	.86	.71	.74	.72	26
.28	.24	.52	.81	.76	.40	.81	32
.30	.30	.53	.86	.71	.47	.76	36
.43	.31	.53	.81	.68	.51	.77	35
.36	.27	.40	.57	.73	.86	.68	25
.17	.54	.30	.42	.50	.48	—	29
.42	.29	.52	.68	.64	.69	.82	—
.50	.36	.76	.73	.69	.72	.82	—
.36	.34	.61	.71	.60	.41	—	27
.32	.38	.61	.74	.62	.48	.78	—
.53	.30	.59	.63	.58	.55	.85	30
.39	.32	.54	.82	.63	.44	.86	30
.50	.33	.51	.73	.64	.52	.70	24
.59	.33	.45	.78	.79	.70	.80	29
.32	.35	.60	.77	.70	.53	.79	27
.43	.34	.64	.82	.70	.63	.73	24
.48	.34	.64	.74	.71	.80	.64	25
—	—	—	—	—	—	N/A	34

TEST/PERFORMANCE STANDARDS & AGENCIES

Product performance test results are reported throughout this catalog. Here are the standards/procedures referenced:

AMA 1-II

AMA 1-II: Ceiling Sound Transmission Tests by the Two-Room Method—determines sound transmission between two adjacent rooms when the path is through the two ceilings and the plenum common to both.

American Society for Testing and Materials (ASTM)

ASTM C423-84a: Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method—covers the measurement of the sound absorption of acoustical materials in a diffused sound field.

ASTM C523-81: Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer—establishes the method for measuring light reflectance of acoustical materials where the application is primarily for predicting room illumination level.

ASTM C635-88: Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings—establishes materials, tolerances, testing and performance of suspension systems.

ASTM C636-88: Installation of Metal Suspension Systems for Acoustical Tile and Lay-in Panels—describes procedures for the installation of suspension systems and recommends acceptable tolerances.

ASTM E84-81a: Surface Burning Characteristics of Building Materials—describes the "tunnel test" method for comparing surface burning characteristics of the materials tested without specific considerations of all the end use parameters that might affect the surface burning characteristics.

ASTM E119-82: Fire Tests of Building Construction and Materials—prescribes a standard exposure fire test method of controlled extent and severity to determine performance of ceilings, walls, columns, floors and other building members under exposure to fire.

ASTM C117-82: Steady State Thermal Transmission Properties by Means of the Guarded Hot Plate—measures thermal resistance "R" values of building materials.

Federal Specifications (FS)

Federal Specification SS-S-118B: Sound Controlling (Acoustical) Tiles and Panels, June 13, 1980—describes the types of boards and tile. See new ASTM standard E1264.

Underwriters Laboratories Inc. (UL)

Fire Resistance Directory—describes the fire resistance of building assemblies using acoustical materials.

Building Materials Directory—provides Surface Burning Characteristics data: (1) flame spread, (2) smoke developed, during fire exposure.

(A) Data on physical properties for sound control products were obtained by testing at recognized laboratories. Sound-test surfaces were painted. Procedures were according to:

- ASTM C523 for light reflectance
- ASTM C423 for sound absorption
- AMA 1-II for sound attenuation

(B) Sound absorption test specimen mountings: #B—adhesive application to gypsum board; #D20—stapled to wood furring strips; #E400 or E405—metal suspension system. Mountings are new designations from ASTM Standard E795-83.

(C) Sound attenuation test specimen mountings, coded: (1st letter) Ad—Adhesive attachment, C—Continuous at partitions, I—Interrupted at partitions; (2nd letter) C—Concealed suspension system, E—Exposed suspension system; (3rd or 4th letter) F—Flat splines, T—Tee splines, X—accessible feature; a—one layer 1½" THERMAFIBER® sound attenuation fire blankets, laid on ceiling continuous; d—two layers 1½" THERMAFIBER sound attenuation fire blankets, laid on ceiling in an 8-ft. width centered over the partition; t—"inverted-T" plenum barrier of 3" THERMAFIBER sound attenuation fire blankets, centered above partition continuous.

(D) Light reflectance coefficients (1.00 = 100% reflected) are classified by Fed. Spec. SS-S-118B/ASTM E1264 into Grades as follows: LR 1, .75 or greater; LR 2, .70-.74; LR 3, .65-.69; LR 4, .60-.64; less than .60, ungraded.

(2) Tile adhesively attached to ½" gypsum panels screw-attached to indirect hung suspension, and interrupted at partition.

(3) Shadowline (rabbeted) edge configuration.

(4) USG PROFILE grid (no longer available).

(5) Interline (rabbeted) edge configuration, FINELINE exposed grid.

(6) Tested at USG Corporation Acoustical Systems Laboratory and witnessed by outside consultants.

UL Design for fire-rated requirements with:

UL Design No.	Assembly Rating (rstrd/unrest-rained)	Approved Types ⁽¹⁾								Size				Appvd Lt Fxlt- Protec (A = Acoust. matrl. B = batt)	Max. Fxlt. Size/ % Area	Duct Area per Ceiling Area (in ² per 100 ft ²)	Construction FC = floor ceiling RC = roof ceiling
										Panel			Other				
		AC	GR	GL	FR-81	FR-83	FR-84	FR-4	M	2'x2'	2'x4'	20"x60"	12"x12"				
up to 3 HR																	
A009	3 hr		•										•	B	2'x4'/16%	110	FC, 2½" conc, cell deck, 8" beam
A207	3 hr 2 hr.		•									•		B	2'x4'/16%	113	FC, 2½" conc, cell deck, 8" beam
G211	3 hr, 2 hr		•							•	•			A,B	2'x4'/16%	113	FC, 3" or 2½" conc, metl lath, 10" jsts 24" o.c.
G213	3 hr, 2 hr		•		•	•	•		•		•			A,B	2'x4'/24%	154	FC, 3" or 2½" conc, metl lath, 10" jsts 24" o.c.
up to 2 HR																	
A010	2 hr, 1½ hr	•											•	B	2'x4'/20%	50	FC, 2½" conc, cell deck, 8" beam
A204	2 hr		•		•	•	•		•		•			A,B	2'x4'/24%	113	FC, 3" conc, stl form units, 8" beam
D201	2 hr		•		•	•	•		•	•	•	•		A,B	2'x4'/24%	576	FC, 2½" conc, cell deck, 8" beam
D209	2 hr 1½ hr				•	•			•	•	•			A,B	2'x4'/8%	—	FC, 3" conc, stl form units, 10" beam
G008	2 hr		•										•	B	2'x4'/16%	288	FC, 2½" conc, metl lath, 8" beam
G018	2 hr	•											•	—	—	50	FC, 2½" conc, metl lath, 10" jsts 24" o.c.
G019	2 hr		•										•	B	2'x4'/24%	113	FC, 2½" conc, metl lath, 10" jsts 24" o.c.
G202	2 hr		•		•	•	•	•		•	•	•		A,B	2'x4'/24%	576	FC, 2½" conc, wire fabric, 10" jsts 30" o.c.
G203	2 hr 1½ hr					•						•	•	B	2'x5'/—	—	FC, 2½" conc, stl form units, 10" jsts, 30" o.c., 10" beam
G204	2 hr				•	•	•	•	•	•	•	•	•	A,B	2½'x5'/25%	110	FC, 2½" conc, wire fabric, 10" jsts 30" o.c.
G215	2 hr	•	•		•	•	•		•	•	•	•		B	2'x4'/25%	154	FC, 2½" conc, metl lath, 10" jsts 24" o.c.
G222	2 hr,									•				A,B	2'x4'/12%	113	FC, 2½" conc, rib lath on 10" jsts at 24" o.c.
G227	2 hr		•							•	•			A,B	2'x4'/16%	57	FC, 2½ conc, metl lath, 10" jsts 24" o.c., 8" beam
G228	2 hr, 1½ hr	•								•				A,B	2'x2'/12%	57	FC, 2½" conc, metal lath, 10" jsts 24" o.c., 8" beam
G231	2 hr		•							•	•	•	•	A, B	2'x4'/16%	57	FC, 2½" conc, metl lath, 8" jsts 24" o.c., 8" beam
J201	2 hr 1½ hr				•	•	•		•		•	•		A, B	2'x4'/24%	576	FC, 2½" conc, pan beam
J202	2 hr		•							•	•			A, B	2'x4'/14%	57	FC, 2" conc, 6" stems 48" o.c.
L211	2 hr							•			•			B	1'x4'/16% 2'x2'/20% 2'x4'/24%	144	FC, wood flr, wood jsts 16" o.c.
P237	2 hr							•			•			B	1'x4'/16% 2'x2'/20% 2'x4'/24%	144	RC, bu roof, un-lmtd insul, steel deck, 8" jsts 48" o.c.
P241	2 hr							•			•			B	1'x4'/16% 2'x2'/20% 2'x4'/24%	144	RC, bu roof, vrm-clite conc, steel deck, 10" jsts 48" o.c.

UL Designs for fire-rated requirements with:

UL Design No.	Assembly Rating (rstrd/unrest-rated)	Approved Types ⁽¹⁾									Size				Appvd Lt Fxlt-Protec (A = Acoust. matrl. B = batt)	Max. Fxlt. Size/% Area	Duct Area per Ceiling Area (in ² per 100 ft ²)	Construction FC = floor ceiling RC = roof ceiling	
		AC	GR	GL	FR-81	FR-83	FR-84	FR-4	M	Panel			Other	Tile					
										2'x2'	2'x4'	20'x60'		12'x12'					24'x24'
up to 1½ hr.																			
G020	1½ hr	●												●		—	—	50	FC, 2" conc, metl lath, 10" jsts 24" o.c.
G259	1½ hr											●				—	2'x4'/16%	57	FC, 2½" conc, rib lath on 10" jsts at 24" o.c.
G264	1½ hr,		●								●					A	2'x2'/24%	113	FC, 2½" conc, stl form units, 8" jsts, 24" o.c.
P230	1½ hr, 1 hr		●			●	●	●		●	●	●				A, B	2'x4'/24%	576	RC, bu roof, unlmtd lmted insul, steel deck, 8" jsts 48" o.c.
up to 1 HR																			
G201	1 hr					●						●					2'x4'/8%	—	FC, 2½" conc, metl lath, 10" jsts 24" o.c.
L003	1 hr	●												●		—	—	—	FC, wood flr, wood jsts 16" o.c.
L202	1 hr		●		●	●	●		●	●	●	●				A, B	2'x4'/16%	110	FC, wood flr, wood jsts 16" o.c.
L206	1 hr		●	●						●	●					A, B	2'x4'/8%	110	FC, wood flr, wood jsts 16" o.c.
L212	1 hr								●		●	●				B	2'x2'/16% 2'x4'/24%	144	FC, wood flr, wood jsts 16" o.c.
P201	1 hr					●		●				●				—	—	—	RC, bu roof, deck steel, 10" jsts 84" o.c., 8" beam
P202	1 hr ¾ hr					●				●		●				A, B	2'x4'/16%	57	RC, bu roof, deck steel, 8" jsts 48" o.c., 6" beam
P203	¾ hr					●				●		●				A, B	2'x4'/24%	113	RC, bu roof, deck steel, 8" jsts 60" o.c., 6" beam
P214	1 hr		●							●	●					B	2'x4'/16%	57	RC, bu roof, steel deck, 10" jsts 72" o.c., 8" beam
P235	1 hr		●			●	●					●				B	2'x4'/25%	255	RC, bu roof, 1"-4" rigid foam plas insul (U-104-041), steel deck, 10" jsts 72" o.c.
P238	1 hr							●		●	●					A	1'x4'/12% 2'x2'/16% 2'x4'/24%	576	RC, bu roof, un-lmtd insul, steel deck, 8" jsts 48" o.c.
P245	1 hr							●		●	●					A	1'x4'/12% 2'x2'/16% 2'x4'/24%	576	RC, bu roof, mineral & fibrbds, 2" form bds, 14" jsts 84" o.c.
P246	1 hr					●	●			●	●	●				B	2'x4'/24% air-hndlg or static	576	RC, bu roof, 2" foam plas insul 2" vrmclite conc, 8" jsts 48" o.c.
P255	1 hr		●							●	●					A	2'x4'/24%	57	RC, bu roof, 2"-3" foam plas insul, 2" vrmclite conc, 8" jsts 48" o.c.
P257	1 hr		●			●	●			●	●					A, B	2'x4'/25%	255	RC, bu roof, double layer insul, steel deck, 8" jsts 24" o.c.

(1) Approved types of products indicated for UL Designs include:

AC—ACOUSTONE FIRECODE Tile and Panels in all patterns;

GR—AURATONE FIRECODE products/patterns as follows: Fissured, Omni Fissured, Pin-Perforated, Nordic, Tahoe, Aspen, SUPER-E Panels, The ILLUSION Ceiling Series;

GL—GLIP Panels;

FR-81—AURATONE FIRECODE products/patterns as follows: Natural Fissured II, Pebbled, Aurora, ROCK FACE;

FR-83—AURATONE FIRECODE patterns: Natural Fissured II;

FR-84—AURATONE FIRECODE products: PREMIER Ceilings;

FR-4—AURATONE FIRECODE products: CERAMIC HERITAGE Ceilings;

M—AURATONE FIRECODE products: METAL FACE Ceilings, CLEAN ROOM Ceilings.

FIRE AND SOUND ACCESSORIES

Fire Protection—THERMAFIBER kits provide maximum protection around light fixtures. Made from mineral fiber, THERMAFIBER insulation's melt point is over 2000°F, far higher than glass fiber. Surface burning characteristics of THERMAFIBER insulation are flame spread—15, smoke developed—0 (ASTM E84 test procedure). THERMAFIBER insulation has been fire tested in dozens of ACOUSTONE and AURATONE ceilings and rated up to 3 hours.

THERMAFIBER insulation is lightweight (.63 lb./ft.²), so it will not overstress conventional grid systems. Plus its optimum density reduces sound transmission and heat leaks through the ceiling.

THERMAFIBER light fixture protection kits come already sized for assembly around standard 2' x 4' fixtures. Or they can be easily cut with a utility knife to fit 1' x 4' or 2' x 2' fixtures or other special size fixtures. THERMAFIBER light fixture protection is easily wire-tied and suspended over fixtures. Each kit contains enough material for protection of 10 2' x 4' fixtures, 17 2' x 2' fixtures, or 20 1' x 4' fixtures.

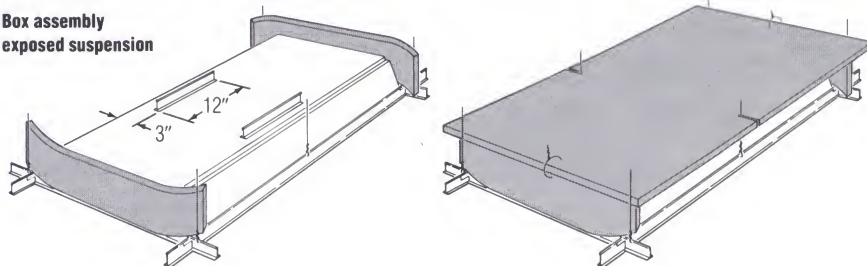
Sound Attenuation—Plenum sound barriers improve sound attenuation by reducing flanking sound.

For overlaid insulation, two installation methods are recommended: a single layer of 1½" THERMAFIBER sound attenuation fire blanket insulation (not shown) can be placed over the entire ceiling; or a double layer 1½" (or single layer 3") THERMAFIBER sound attenuation fire blanket insulation can be overlaid in a 4'-width along each side of partitions (see drawing).

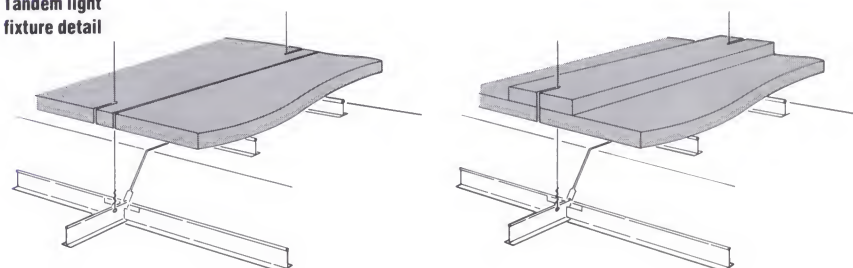
Formed semi-rigid insulation barriers offer greater acoustical efficiency and economy, making them preferred to overlaid insulation. Three types are available: vertical barrier; inverted "T" barriers; and tent barriers.

Light Fixture Protection for Fire-Rated Ceilings

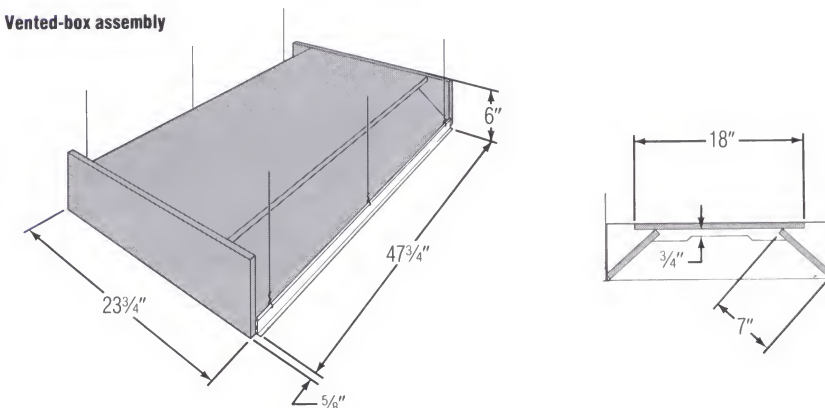
Box assembly exposed suspension



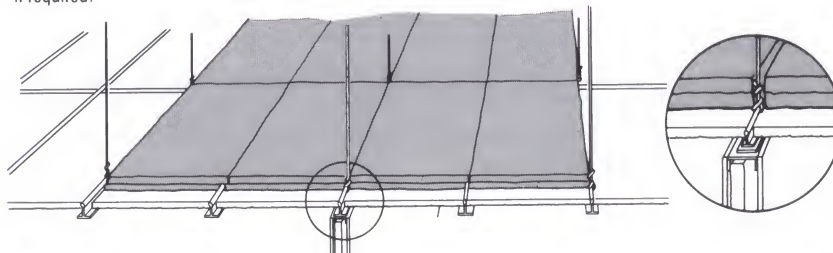
Tandem light fixture detail



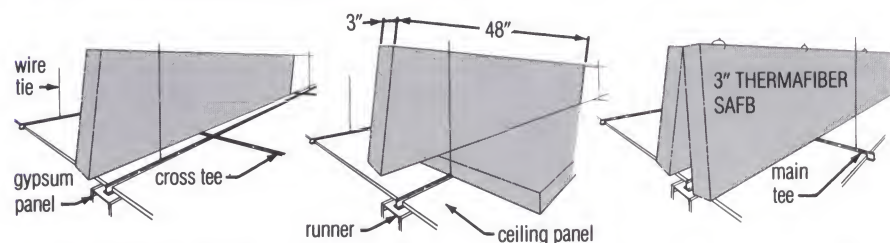
Vented-box assembly



Plenum sound barriers—field-fabricated from 3-in. thick, 2x4-ft. THERMAFIBER sound attenuation fire blankets installed longitudinally. Field-cut 2-ft. width as necessary to fit plenum depth, with 3 to 4-in. allowable clearance above blankets to maintain full sound attenuation effectiveness (test values). Check for adequacy of plenum air flow, if required.



Mounting CED—STC's in the 40-44 range with 2x2-ft. Glacier ACOUSTONE panel or 2x4-ft. Fissured AURATONE panel ceilings (illustrated, also see text and page 46 for individual product STC ranges).



Vertical barrier over partition

Inverted "T" barrier over partition

Tent barrier over partition

PRODUCT LIMITATIONS

Environmental Conditions—Do not use ACOUSTONE, AURATONE, or GLIP panels in 1) high humidity, 2) areas below wainscot height, or 3) areas otherwise exposed to impact, abrasion or tampering. These products are sized and designed for use within the standard occupancy range of temperature and humidity, 60-85°F, no more than 75% RH (90°F/90% RH for CERAMIC HERITAGE and SUPER-E panels). Humidity can greatly affect product dimensional stability and sag resistance. Sag can become noticeable during periods of high humidity lasting only a few hours. For GLIP panels, provide ventilation in enclosed spaces above panels. Do not use ORION ceiling panels, or PREMIER Nubby or HI-LITE glass fiber acoustical ceiling products where a concentration of chemical fumes is present, in areas exposed to impact or abrasion, in coolers or cold storage rooms or adjacent areas, above swimming pools, or where radiant temperature exceeds 140°F.

Installation—Install these ceiling products under ambient conditions within the standard occupancy range, after residual moisture from plaster, concrete and terrazzo work has dissipated. Allow time for dimensional changes in those products stored at temperature/humidity conditions well outside of those recommended for service. With increases in temperature/humidity, ACOUSTONE and AURATONE panels expand (up to $\frac{1}{64}$ in./ft at 80°F/90% RH) and may not fit into a fixed grid. Conversely, with decreases, these products will be undersize, but expand to normal when standard ambient conditions return. For some patterns, if perimeter panels must be cut smaller, the abutting edge must be field-rabbetted or the wall angle must be lowered $\frac{3}{16}$ ". Foil-back ACOUSTONE tile should not be adhesively applied.

Overlaid Material—Although ACOUSTONE and AURATONE products are sag-resistant, loading aggravates the tendency to sag. To prevent objectionable sag, limit overlaid insulation or other material to .75 lb./ft² maximum (3.50 lb./ft² maximum on SUPER-E products).

Fire-Rating—UL Design fire rating requires: (1) FIRECODE formulation products, (2) fire-rated suspension system, (3) entire ceiling installation as specified in UL Design, (4) ceiling be free of overlaid material not specified in the design.

Suspension System—For panels in exposed grids in high-humidity applications, use aluminum or galvanized suspension systems. For exterior applications, suspension system should be approved by manufacturer. Grid tee deflection should be limited to $\frac{1}{360}$ of span, maximum, for intended esthetics in ceiling applications.

Color Uniformity—Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings and fabrics is considered well within normally accepted commercial tolerance.

Product Lots—Texture, room lighting and subjectivity of observer can affect perceived color. In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton) to minimize the effect.

Fire Protection Accessory Limitations—*Fire Rating.* Fire ratings may be nullified by overlaid material unless material was specified in the UL Design. *Overlaid Weight.* Possibility of sag in panels (see "Environmental Conditions" above) usually limits overlaid weight, but ceiling/suspension strength is another limiting factor.

10-Year Limited Warranty—USG Interiors, Inc. warrants its ORION ceiling panels and PREMIER glass fiber ceiling panels for 10 years from the date of installation against sagging, warping, shrinking or delamination of finished surfaces subject to normal, allowable manufacturing tolerances and further conditions. For details, contact your sales representative.

GOOD DESIGN PRACTICES

Storage Conditions—Ceiling material storage time at the jobsite should be as short as possible, and environmental conditions should be as near as possible to those specified for occupancy (see "Occupancy Conditions" below).

Excess humidity during storage can cause expansion of acoustical material and possible warp, sag or poor fit after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.

Damaged or deteriorated materials should be removed from the premises. Immediately before installation, to stabilize tile and panels, store them at a location where temperature and humidity conditions duplicate those ambient during installation and anticipated for occupancy.

Occupancy Conditions—These acoustical and suspension products are designed for installation and use under standard occupancy conditions of temperature and humidity (60-85°F, no more than 75% RH).

Maintenance—Wash with damp sponge or clean with a vacuum cleaner or chemical rubber sponge (used dry). To repaint, spray a thinned, nonbridging vinyl-acrylic flat wall paint. Repaint plastic coated surfaces with a nonbridging vinyl-acrylic flat enamel or other nonbridging paint, properly formulated to retain natural semi-gloss appearance.

Insulation—The roof deck above acoustical ceiling products must be properly vented and insulated, and incorporate a vapor retarder to prevent condensation and staining of the ceiling. Insulation blankets can be overlaid on the ceiling, so long as they do not exceed .75 lb./ft.² (.25 lb./ft.² for ORION ceiling panels), but under some conditions can cause objectionable panel sag. The

space above must always be adequately ventilated to prevent moisture buildup in the insulation. In addition, overlaid material of any kind inhibits access through the ceiling, and nullifies an assembly's fire rating unless specified in the UL Design or locally approved.

Critical Lighting—Do not use Square edge (SE) tile in concealed systems for ceilings subjected to strong sidelighting.

Strong sidelighting with slight angle of incidence to ceiling surface greatly exaggerates surface irregularities. It demands careful, precise installation to avoid job problems and owner complaints. Effects can be minimized by using bevel-edge or rough surface patterns instead of smooth-surfaced or square-edge units, or by employing an exposed suspension. Shadows often can be eliminated or softened with draperies or blinds.

Storage Conditions—Ceiling material storage time at the jobsite should be as short as possible, and environmental conditions should be as near as possible to those specified for occupancy (see "Occupancy Conditions" below).

Excess humidity during storage can cause expansion of acoustical material and possible warp, sag or poor fit after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.

Damaged or deteriorated materials should be removed from the premises. Immediately before installation, to stabilize tile and panels, store them at a location where temperature and humidity conditions duplicate those ambient during installation and anticipated for occupancy.

Occupancy Conditions—These acoustical and suspension products are designed for installation and use under

standard occupancy conditions of temperature and humidity (65-85°F, no more than 70% RH).

Maintenance—Wash with damp sponge or clean with a vacuum cleaner or chemical rubber sponge (used dry). To repaint, spray a thinned, nonbridging vinyl-acrylic flat wall paint. Repaint plastic coated surfaces with a nonbridging vinyl-acrylic flat enamel or other nonbridging paint, properly formulated to retain natural semi-gloss appearance.

Insulation—The roof deck above acoustical ceiling products must be properly vented and insulated, and incorporate a vapor retarder to prevent condensation and staining of the ceiling. Insulation blankets can be overlaid on the ceiling, so long as they do not exceed .75 lb./ft.² (.25 lb./ft.² for ORION ceiling panels), but under some conditions can cause objectionable panel sag. The space above must always be adequately ventilated to prevent moisture buildup in the insulation. In addition, overlaid material of any kind inhibits access through the ceiling, and nullifies an assembly's fire rating unless specified in the UL Design or locally approved.

Critical Lighting—Do not use Square edge (SE) tile in concealed systems for ceilings subjected to strong sidelighting.

Strong sidelighting with slight angle of incidence to ceiling surface greatly exaggerates surface irregularities. It demands careful, precise installation to avoid job problems and owner complaints. Effects can be minimized by using bevel-edge or rough surface patterns instead of smooth-surfaced or square-edge units, or by employing an exposed suspension. Shadows often can be eliminated or softened with draperies or blinds.

Part 1: General

1.1 Scope—Specify areas to receive this acoustical treatment.

1.2 Qualifications

Construction conditions shall comply with ASTM C636. Acoustical material and suspension systems, including all necessary hangers, grillage, splines and supporting hardware, shall be furnished and installed by an acoustical contractor.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Immediately before installation, tile and panels shall be stored for a sufficient time to stabilize temperature and humidity conditions ambient during installation and anticipated for occupancy.

1.4 Environmental Conditions

Installation of ACOUSTONE and AURATONE acoustical tile and panels and suspension systems shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated. Installation of GLIP panels shall not begin in an exterior application until protection from direct exposure to water and weather has been provided. ORION ceiling panels and PREMIER glass fiber ceiling panels can be installed and used in temperature and humidity conditions up to 90°F, no more than 90% RH.

1.5 Design Conditions

Systems shall be rated NRC () in accordance with ASTM C423 and STC () in accordance with AMA 1-II as tested by an independent agency.

Part 2: Products

2.1 ORION

ORION (210) (220) (270) mineral fiber ceiling (panels) (FIRECODE panels, approved for UL Design No. []), by USG Interiors, Inc., having laminated (Nubby fabric) (vinyl) surface, () pattern, () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (pages 6-8) for pattern, item number, color, size, edge, NRC and STC options.

2.2 ACOUSTONE

ACOUSTONE molded mineral fiber (tile) (FIRECODE tile, approved for UL Design No. []) (panels) (FIRECODE panels, approved for UL Design No. []), by USG Interiors, Inc., free of mechanical perforations, non-breathing factory-applied foil backing () pattern, () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (pages 10-16) for pattern, item number, color, size, edge, NRC and STC options.

2.3 AURATONE

AURATONE water-felted mineral fiber (tile) (FIRECODE tile, approved for UL Design No. []), (panels), (FIRECODE panels, approved for UL Design No. []), by USG Interiors, Inc., () pattern, () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (pages 18-30) for pattern, item number, color, size, edge, NRC and STC options.

2.4 Special-Function

AURATONE (FIRECODE) special function products by USG Interiors, Inc., () item number, () color, () size, () edge, NRC range (), STC range ().

2.4.1 Abuse-Resistant FIRECODE panels, approved for UL Design No. (), (ROCK FACE pattern) (IMPACTION System).

2.4.2 Environment-Resistant

FIRECODE panels, approved for UL Design No. (), (CERAMIC HERITAGE) (METAL FACE [perforated] [unperforated]) (SUPER-E [perforated] [unperforated]) pattern.

2.4.3 Sanitary Condition

FIRECODE panels, approved for UL Design No. (), CLEAN ROOM pattern (Class 100, unperforated) (Class 10,000-100,000, perforated).

2.5 Gypsum Ceiling Panels

FIRECODE core GLIP panels by USG Interiors, Inc., () item number, unit facing (white vinyl stipple pattern) (unfinished paper) (painted), () size, square edge.

2.6 Extra Sound Absorbent

PREMIER glass fiber substrate panels by USG Interiors, Inc., () item number, () size, () edge, (Nubby) (Twill) (Kapok) laminated facing, () NRC, in white color.

Note to specifier: Refer to product descriptions (pages 32-36) for item number, color, size, edge, NRC and STC options.

2.7 Fire Rating Accessories

By USG Interiors, Inc.:

2.7.1 THERMAFIBER Light Fixture

Protection, (box) (tent) (vented-box) type assembly approved for UL Design No. (), of semi-rigid spun mineral-fiber board, nom. 1¼" thick, unfaced and unbacked.

2.7.2 THERMAFIBER Fire Protection

Batts, approved light-fixture protection field-fabricated to UL Design No. () requirements from flexible spun mineral-fiber mats, 1½" thick, unfaced and unbacked.

2.8 Sound Rating Accessories

THERMAFIBER SAFB insulation of spun mineral-fiber, semi-rigid mats with square-cut edges, unfaced and unbacked, by USG Interiors, Inc.:

2.8.1 Installed over Partition

Stud Cavities, (1½) (3) x 2' x 4' sizes, (single-layer on entire ceiling) (double-layer on ceiling in 8'-wide strips centered on partitions).

2.8.2 Installed as Plenum Barriers, 3" x 2' x 4' sizes, of (vertical) (inverted "T") (tent) type.

2.8.3 Overlaid on Ceiling, 1½" x 2' x 4' sizes, (single-layer on entire ceiling) (double-layer on ceiling in strips extending 4' to each side of partitions).

2.9 Down Suspension Systems
By USG Interiors, Inc.:

2.9.1 Fire-Rated Concealed Suspension, meeting ASTM C635. (DX tee system with splines that engage adjacent tile.) (Rigid X tee system with screw-applied gypsum board.)

2.9.2 Fire-Rated Exposed Suspension, (DXL) (CENTRICITEE DXLT) (FINELINE DXLF) (Environmental ZXLA Grid System), per UL Design No. (), all main and cross tees meeting "intermediate" or "heavy" duty classifications of ASTM C635, () color.

2.9.3 Class A Exposed Suspension, meeting "intermediate" or "heavy" duty main tee structural standards of ASTM C635, () color.

2.9.4 Corrosion-Resistant Exposed Suspension, (DXLA) (Highline) (Environmental ZXA Grid System) (Environmental AX Grid System), () color.

2.9.5 Narrow ½" Reveal Geometrix Suspension, (GTX) accepts Geometrix or Fine Fissured panels, () color.

Note to specifier: Refer to product descriptions (pages 38-39) for color options.

Part 3: Execution

3.1 Suspended

Install acoustical material and suspension system, including necessary hangers, grillage, splines and other supporting hardware, in accordance with ASTM C636, all code requirements and sound industry practice (such as CISC guidelines).

3.2 Adhesive

Apply tile with an adhesive manufactured specifically for this purpose, in accordance with manufacturer's directions, and/or as follows. Brush off any loose dust from tile back surfaces and prime them where adhesive is to

be applied. This lays down any residual dust to assure good adhesion. Prime only a 2-3" circle near each corner by buttering a very thin coat of adhesive with trowel blade at a 45° angle. Then apply a walnut-sized dab of adhesive to each of the 4 circles and press tile firmly in place. Insert splines in kerfs at corners of units. Foil-backed ACOUSTONE tile should not be adhesively applied.

3.3 ACOUSTONE "F" Fissured Tile
Intermix tile from 4 or more cartons to obtain uniform distribution of fissure variations.

3.4 The ILLUSION Ceiling Series Exposed Grid Suspension
Install inverted tee, direct-hung, exposed surface system having low-gloss finish and color of The ILLUSION Ceiling Series. System should meet "intermediate" or better structural standards of ASTM C635.

3.5 Fire-Rated Suspension
Install suspension per UL Design No. () and ASTM C636.

3.6 Light Fixture Protection
Install light fixture protection and necessary hangers and ties in accordance with UL Design No. () and ASTM C636.

3.7 Ceiling Sound Insulation
Lay blankets flat on ceiling panels and tightly fit around all grillage, hangers and other vertical penetrations:

3.7.1 Single-Layer over entire ceiling.

3.7.2 Double-Layer, 3" total thickness, over that part of ceiling extending 48" on each side of all partitions.

3.8 Plenum Sound Barriers
Install THERMAFIBER blankets; cut vertical blankets as necessary to clear plenum obstructions:

3.8.1 Upside Down "T"—Lay horizontal blankets on ceiling grid extending 1' on either side of partition centerline and lean vertical blankets against hanger wires for support.

3.8.2 Vertical Barrier—Lean vertical blankets against hanger wires for support over partition centerline.

3.8.3 Tent Barrier—Lean blankets together over partition centerline and wire or clip tops together.

Product Index

Alphabetical List of Patterns		Color Availability		
Pattern	Page	White Only	White Plus Selected Colors	All Colors
Allegro	24			X
Aspen	25			X
Aurora	25	X		
Calypso	24			X
CERAMIC HERITAGE	36	X		
Checkline	14	X		
Checkmate	14	X		
Chex/4	14	X		
Chex/9	14	X		
Chex/16	14	X		
CLEAN ROOM	35	X		
Corona	28			X
DESIGNER SQUARES	20		X	
"F" Fissured	16	X		
Fine Fissured	28			X
Finesse	16	X		
Fissured	29	X		
Frost	11			X
GLACIER	12			X
GLIP Panels	34	X		
Hi-LITE Kapok	33	X		
Hi-LITE Twill	33	X		
Hi-NRC Fine Fissured	26			X
Hi-NRC Omni Fissured	26			X
ILLUSION Ceiling Series	22		X	
IMPACTION System	32	X		
LINEAR EXPRESSIONS	10			X
METAL FACE (perforated)	36	X		
METAL FACE (unperforated)	36	X		
Natural Fissured II	27	X		
Nordic	30	X		
Nubby	33	X		
Omni Fissured	27			X
ORION 210	6	X		
ORION 220	6	X		
ORION 270	6	X		
PEDESTALS, ACOUSTONE	14		X	
PEDESTALS, AURATONE	19		X	
Pebbled	30	X		
Pin-Perforated	30	X		
Pin-Perforated II	30	X		
PREMIER Fine Fissured	26			X
PREMIER Natural Fissured II	26	X		
Prisms	20			X
PROFILE Series	18		X	
ROCK FACE	32	X		
SUPER-E	36	X		
Surf	24		X	
Tahoe	25			X

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Interiors from every angle.™

USG Interiors, Inc.

101 South Wacker Drive
Chicago, Illinois 60606

SA-905/1-91 Printed in U.S.A.

INTEGRATED

CEILINGS[™]

Specialty

Products



USG Interiors, Inc.

USG

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USG Interiors, Inc. is proud to offer the industry's most innovative resource of specialty ceiling designs. Developed for unique architectural settings, our Integrated Ceilings transform open ceiling planes into spectacular, artistic spaces. Complete ceiling systems come to the jobsite pre-engineered, fitted, painted and ready for assembly.

Dozens of options are available, including luminous skylights, elegant reflective surfaces, fabric-wrapped ceilings and walls, open plenum treatments and acoustical linear metal. Specialty materials include acrylic "glass block" panels and pressed metal panels.

Cover: New TRANSPARENCIES Walls.

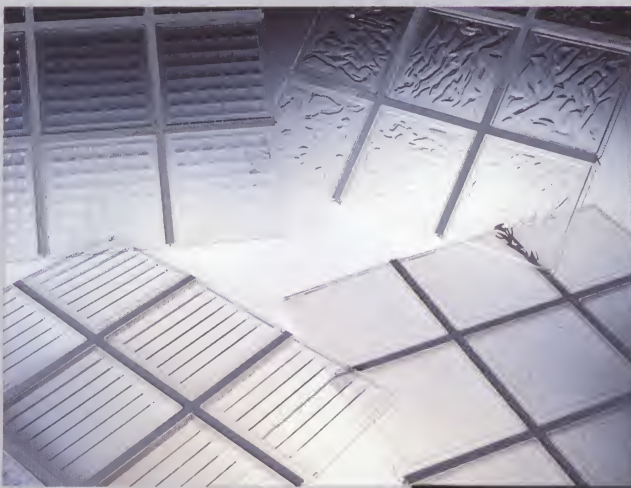
Color photographs in this brochure show colors that are as close as possible to actual products. For exact finishes, see product samples offered by your USG Interiors sales representative.

TRANSPARENCIES CEILINGS, WALLS AND WINDOWS

TRANSPARENCIES panels give the same subtly refracted light play as traditional glass blocks, but with just a fraction of the weight, cost, and installation difficulties of glass. Lightweight, acrylic TRANSPARENCIES ceiling panels fit into a texturized exposed DONN suspension system for easy lay-in installation. Panels may be easily removed for cleaning or relamping without the use of tools. TRANSPARENCIES Walls and TRANSPARENCIES Windows allow creative interplay among all areas of a room's interior.

Standard designs: TRANSPARENCIES 100 (Crushed Ice pattern), TRANSPARENCIES 200 (Icicle pattern), TRANSPARENCIES 300 (Ice Cube pattern), TRANSPARENCIES 400 (Melting Ice pattern).

Standard size: 2'x2' panels.



For TRANSPARENCIES ceilings, it is recommended that fluorescent strip fixtures be placed a minimum of 18" above the ceiling and 18" o.c. for best results.



INTERSECTIONS CEILING SYSTEM The INTERSECTIONS system provides an ingenious revision of the typical acoustical ceiling. This completely original system combines 2'x2' and 5"x5" modules using a single grid element. Installed at an 11½° angle to the perimeter of the space, the INTERSECTIONS ceiling system breaks away from the conventional look of rectilinear ceilings.

The system features ACOUSTONE® Frost 2'x2' panels and already cut-to-size Frost 5"x5" accent panels. Or the smaller modules can accommodate recessed light fixtures, sensors, sprinklers or speakers.

INTERSECTIONS island trim preserves the floating perimeter while framing the ceiling with a finished, mitered edge.

Standard panel sizes: 2'x2' and 5"x5".

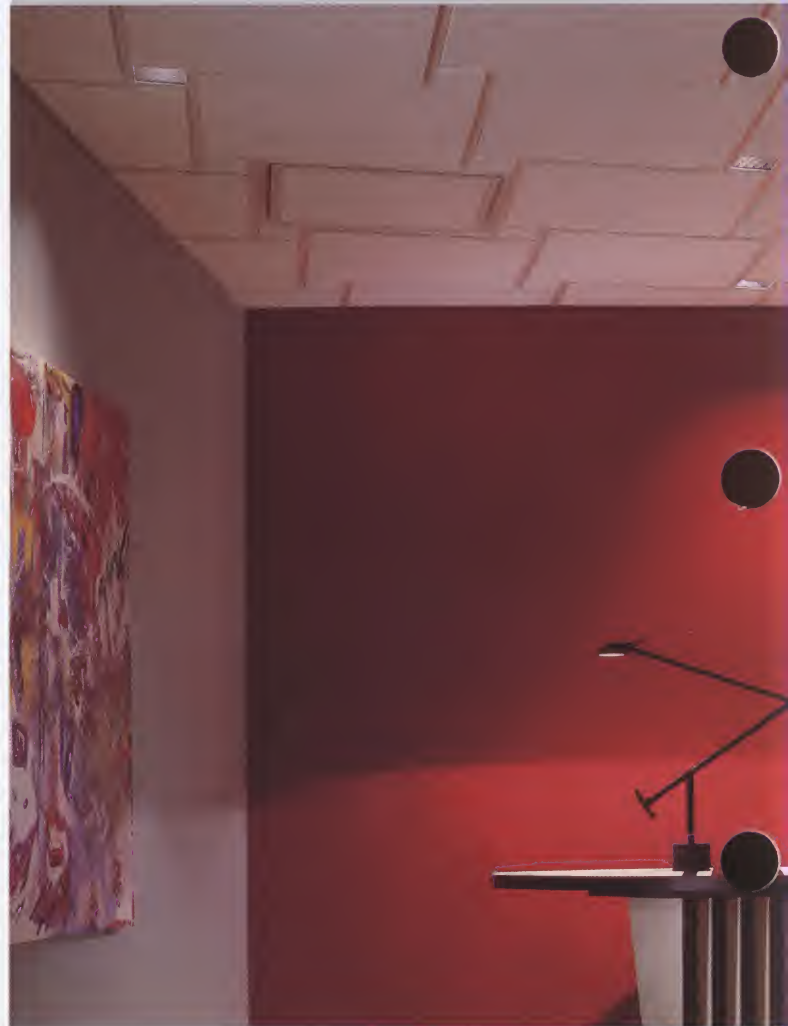
Standard grid size: 29" length, 1½" height, 15/16" face.

Standard colors: flat white, manila, silvertone, parchment, taupe, mist.



INTERSECTIONS
island trim.

INTERSECTIONS ceiling system in flat white integrates INTERSECTIONS air diffuser and recessed lighting for a clean, uninterrupted ceiling plane.



GEOMETRIX CEILINGS

Geometrix panels echo the geometry of suspension grid lines with symmetrical, screen-printed patterns. A single pattern can be used across the entire ceiling to create a clean, graphic design. Patterns also can be combined to build unique overall designs or to accent perimeter areas. Panels install into finely crafted, 1/8" reveal Geometrix suspension.

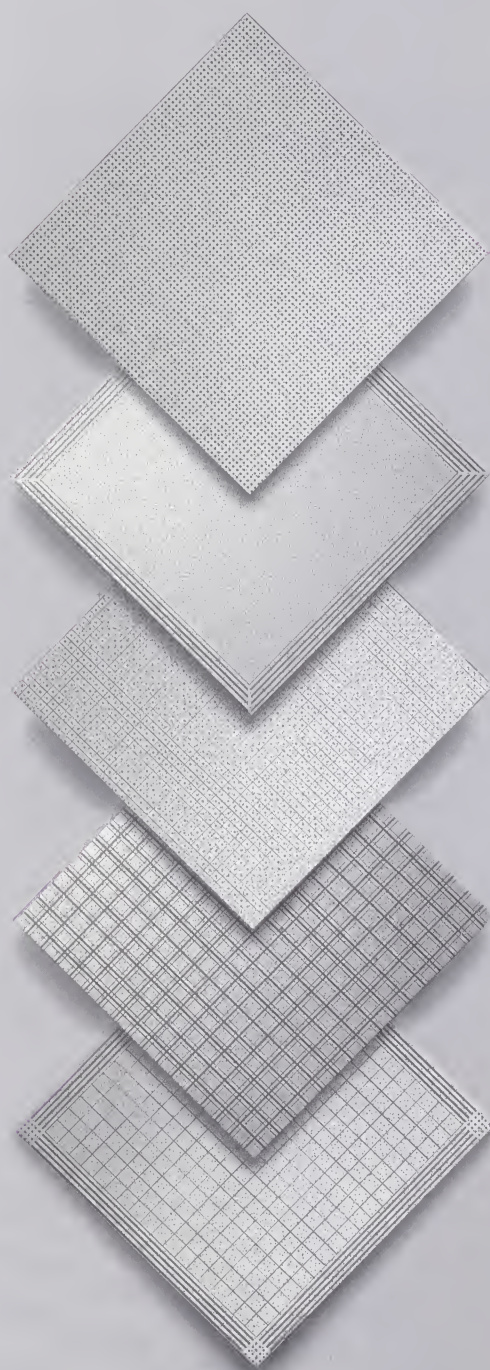
Standard designs: Minuend, Miter, Matrix, Micron, Metro.

Standard colors: gray/white patterns, white suspension.*

Standard size: 2'x2' panels.

*Special screened colors are available upon request.

**Coverage of design can be ordered across the entire panel or in just one, two, or three quadrants.



Minuend**

Miter

Matrix

Micron

Metro

Matrix panels and Geometrix suspension system.





MIRRAPLANE MP-300
ceiling.



MIRRAPLANE MP-200
ceiling.

MIRRAPLANE CEILINGS Premium grade, highly polished stainless steel MIRRAPLANE panels have a rich luster and taut, flat appearance. Suspended on a unique concealed grid with only a hairline joint between panels, MIRRAPLANE ceilings present an almost seamless mirrored plane. Installation is easy; each panel can be lowered on torsion springs for easy access to plenum space above.

Standard designs: unperforated (MP-100), round perforations (MP-200), square perforations (MP-300).

Standard size: 2'x2' panels.



MIRRAPLANE MP-100
ceiling.

CELEBRATION CEILINGS Sophisticated CELEBRATION panels of anodized aluminum are dramatically space extending, making rooms seem longer and wider. Painted CELEBRATION panels create clean-lined, contemporary ceilings. Or choose elegant fabric-covered panels for special areas. All CELEBRATION ceilings combine great looks with the hidden strength of metal.

CELEBRATION panels are easily snapped into standard DONN FINELINE® grid. The finished CELEBRATION ceiling presents an elegant graphic design with panels that seem to float within the reveal surrounding them. Panels can be easily removed for fast access to the plenum.

Anodized reflective finishes: chrome, smoke and brass colors in polished or satin finish.

Other standard finishes: painted (smooth or perforated), fabric-covered (Guiford FR701).

Standard panel size: 2'x2' (30"x30" on special order).

Fabric-covered CELEBRATION ceiling incorporating CELEBRATION air diffuser.

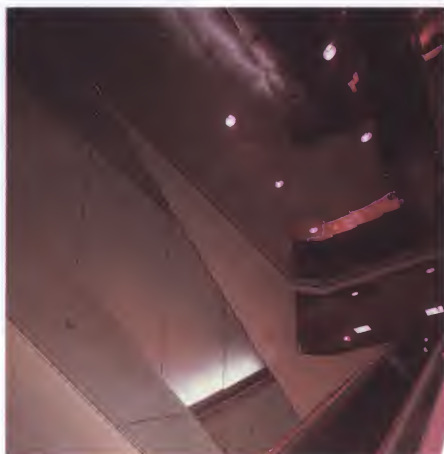


Satin-finish CELEBRATION ceiling.

SPECTRA CEILINGS

The ultimate in reflective ceiling simplicity: premium grade clear stainless steel panels fit into a DONN DX® suspension that is capped in polished chrome. The result is a quality mirrored surface at a budget price. SPECTRA panels can be field cut to accommodate columns and walls. A standard chrome-capped angle provides a finished perimeter at the wall.

Standard panel size: 2'x2'. Other sizes on special order.



SPECTRA ceiling.

VISTA SONIC CEILINGS A safe, shatterproof, economical alternative to mirrored glass tile, only VISTA SONIC panels combine sound absorption with a mirror-quality finish. VISTA SONIC panels are made of tough, aluminized-polyester film stretched over a framed, mineral fiber acoustical panel. These panels are damage resistant and flex under minor impact. They install easily into standard exposed DONN grid and are non-static for minimal cleaning.

Standard colors: silver, brushed silver, gold, bronze, pearl white and black reflective.

Standard size: 2'x2' panels.



VISTA SONIC ceiling.

IMPRINTS CEILINGS IMPRINTS panels express the art of pressed metal ceiling design while providing instant access to the plenum required for contemporary spaces. Steel panels are installed in exposed DONN grid capped with matching colors.

Standard designs: Contempo concentric circles (IM-100), Art Deco domes (IM-200), Western squares (IM-400).

Standard finishes: polished brass, polished chrome, ivory baked enamel.

Standard size: 2'x2' panels.



IMPRINTS IM-200 ceiling.



IMPRINTS IM-100 ceiling.



IMPRINTS IM-400 ceiling.



PIPE AND JUNCTION SYSTEMS An ingenious component parts system designed to create suspended or freestanding two- or three-dimensional open structures. Lightweight, inexpensive roll-formed pipes and 2-piece die-cast junctions can be combined into virtually any flat or cubed arrangement. New PJCR 90° radius pipe adds graceful curves and infinite design possibilities. Decorative, structural PIPE AND JUNCTION modules can support lighting fixtures, signs and banners, and they are easy to assemble, disassemble and store for future use.

Standard finishes: painted white, bright chrome casting with polished aluminum pipe.

Other options: polished brass, custom colors.

Standard modules: 2', 30", 3'.

Standard fabric inserts: bright primary colors in cotton or polyester.

SPACECUBE CEILINGS This nonmodular open cell system brightens ceiling areas while allowing existing lighting and HVAC to filter through. Economical 2'x4' modified CENTRICITEE™ suspension system disappears into the continuous louver design. Looks great even after repeated access.

Standard finish: off-white.

Options: polished aluminum, polished brass.

Standard cell sizes: 4"x4", 8"x8" and 12"x12", 2 1/8" high, 1/2" thick.



SPACECUBE ceiling.

For ACRYLICUBE ceilings, it is recommended that fluorescent strip fixtures be placed a minimum of 18" above the ceiling and 18" o.c. for best results.

ACRYLICUBE CEILINGS Luminous ACRYLICUBE ceilings bring a warm, sunlit effect to interior spaces. ACRYLICUBE modules are installed into a direct hung DONN suspension system that completely disappears into the louver design, creating a ceiling that is uninterrupted by visible grid supports. Each louver is covered by a flat, clear prismatic or opal white diffuser that softens fluorescent lighting from above.

Standard colors: white with opal white diffuser and white suspension, bronze with clear prismatic diffuser and black suspension.

Standard size: 1'x2' panels.



PARALINE CEILINGS Elegant, imaginative linear metal ceilings with clean, crisp lines. PARALINE ceilings are ideal for vast, expansive areas and can be curved to change the dimension of the ceiling plane. UL-tested 2-hour and 3-hour fire ratings are available.

Three styles are offered. PARALINE I and PARALINE III pans feature open reveals that will take advantage of acoustical material in the plenum; NRC ratings are available on request. Closed reveal PARALINE II pans are appropriate for exterior ceiling applications under protected soffits as well as interior applications. For more information, see detailed PARALINE literature offered by your sales representative.

Type of metal: steel or aluminum (PARALINE I and II), aluminum (PARALINE III).

Style: perforated or unperforated (PARALINE I and II), unperforated (PARALINE III).

Standard colors: six standard paint colors, plus custom colors.

Metallic finishes: polished aluminum, polished smoke, polished brass, brushed aluminum (PARALINE I and II only).

Texturized finish: available on PARALINE I and II only.

Standard sizes: 3 1/4" x 12' x 3/4" (PARALINE I and II), 7 1/4" x 12' x 3/4" (PARALINE III).

PARALINE I linear
metal pans.



LINEA CEILINGS

Roll-formed aluminum baffles create a one-directional open-plenum linear ceiling. Baffles attach to a modified 4'x4' flat black DX suspension system with a clip that allows easy removal to access services above.

Attachment clips provide for any alignment of baffles to the grid for unlimited design possibilities. Ideal for remodel work by attaching LINEA baffles to existing $1\frac{5}{16}$ " grid.

Standard finish: off-white (custom finishes also available).

Standard sizes: 6", 8", and 12" baffles all in 12' lengths.

LINEA baffles.



SKYFRAME MODULAR SKYLIGHTS

SKYFRAME assemblies express the feeling of traditional skylights, providing the warmth and brightness of natural daylight. These modular skylights lay into DONN DX ceiling grid and, with a rise of only 8", can fit in plenums as shallow as 11". Light is typically provided from above by inexpensive fluorescent strip fixtures. SKYFRAME assemblies are shipped in kit form for quick field assembly.

Standard light diffuser: flat matte opal white acrylic.

Optional light diffuser: wireglass pattern.

Standard grid finish: charcoal bronze (#120).

Standard module sizes: 4'x4' (special square sizes can be custom ordered).



SKYFRAME modular skylights.

LIGHTFRAME CEILINGS

Luminous panels and bold grid recesses form the unified LIGHTFRAME ceiling design. Fluorescent light is softly diffused through opal white acrylic panels, giving the feeling of natural light and an illusion of generous open vertical space. Each panel consists of a framed luminous diffuser that fits into DONN DX suspension for easy installation.

Standard diffuser: flat matte opal white acrylic. Wire reinforced glass pattern diffuser on special order.

Standard grid finishes: charcoal bronze (#120), walnut.

Standard module sizes: 2'x2', 2'x3', 2'x4'.

LIGHTFRAME ceiling.

For SKYFRAME and LIGHTFRAME ceilings, it is recommended that fluorescent strip fixtures be placed a minimum of 18" above the ceiling and 18" o.c. for best results.



DONN COORDINATOR CEILINGS DONN COORDINATOR 5'x5' modules scale down expansive ceilings. Utilities and services can be incorporated into the runners to eliminate special fixtures. A choice of flat, coffered and pyramid designs offer options to meet every space planning requirement. **Module styles:** coffered, pyramid, flat, one-directional.

DONN COORDINATOR modules.



SILENT SQUARES CEILINGS SILENT SQUARES panels offer an exclusive combination of luxury and efficient sound control. Panels are installed into DONN exposed suspension systems in matching or contrasting colors.

Standard fabrics: Elegance wovens in 12 colors, Elegance Donegal tweeds in 6 colors, Classics plush-textured fabrics in 12 colors.

Edges: Radius Reveal, Interline Square, Interline Radius.

Standard size: 2'x2' panels.



SILENT SQUARES ceiling.

SILENT EXPRESSIONS CEILINGS SILENT EXPRESSIONS custom-

embossed panels using your exclusive design can express a subtle reference to a company image or a bold monogrammed statement. Four tasteful designs are also offered as standard patterns. Panels are installed into conventional exposed suspension systems.

Standard designs: Expressions I, II, III, IV.

Standard fabrics: Classics plush-textured fabrics in 12 colors.

Edge: Radius Reveal.

Standard size: 2'x2' panels.

Monogrammed EXPRESSIONS ceiling.



EXPRESSIONS I, II, III, IV.



SILENT EXPRESSIONS III ceiling.

SILENT 65 AND SILENT 95 WALLS Beautiful SILENT wall panels install easily on steel studs, masonry walls or gypsum drywall. Mineral fiber and glass substrate walls absorb up to 65 percent and 95 percent of sound respectively.

Standard fabrics: Elegance wovens in 12 colors, Elegance Donegal tweeds in 6 colors, Elite ribbed textures in 12 colors, Classics plush-textured fabrics in 12 colors.

Standard size: 30"x9', 30"x10'.



SILENT 65 wall.

SILENT BAFFLES AND SILENT TOUCHES

SILENT Baffles add interest to the ceiling above and define floor space below.



Sound absorbing SILENT Touches enhance wall surfaces.

For further information . . .

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USG Interiors, Inc.

101 South Wacker Drive
Chicago, Illinois 60606-4385

Drywall/Wood Framed Systems



For lightweight, quickly erected, fire-rated walls
and ceilings with excellent sound attenuation

USG

These basic gypsum drywall assemblies offer economical, quickly erected, load-bearing partitions, walls and ceilings wherever fire protection is desired with wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications. Also designed for wood-frame construction are USG Area Separation Walls, fire-rated gypsum drywall assemblies for multi-family housing (see separate System Folder SA-925). Variations of the systems meeting special requirements are outlined below:

Single layer—a basic drywall load-bearing construction suitable where SHEETROCK brand Gypsum Panels are applied direct to wood framing—either vertically with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Perpendicular application, recommended except in certain fire-rated partition construction or for predecorated panels, provides greater strength, reduces joint treatment and blocking needed, and compensates for uneven framing alignment. Fastening of panels is by four alternate methods:

- 1 **Standard single nailing**—6" to 7" o.c. spacing for ceilings, 7" to 8" for walls.
- 2 **Double nailing**—for minimizing defects due to loosely nailed panels. First nails spaced 12" o.c., followed by second nails in close proximity (2") of first.
- 3 **Screw application**—best known insurance against fastener pops caused by loosely attached panels. 1 1/4" Type W screw is used.
- 4 **Adhesive application**—continuous bead of drywall stud adhesive applied to framing plus supplementary nailing; improves bond strength by 50% to 100%, greatly reduces face nailing needed. When vinyl foam tape is used on sidewalls with stud adhesive, supplementary fasteners are unnecessary.

Three other proven methods upgrade job quality:

- 1 **SHEETROCK brand Gypsum Panels, SW Edge**—Panels have an exclusive tapered rounded edge to help minimize ridging or beading and other imperfections and help compensate for extremes of temperature and humidity during construction.
- 2 **Back-Blocking Joint Reinforcement**—a method designed to minimize an inherent joint deformation ("ridging") that may occur with adverse job and weather conditions.
- 3 **Floating Interior Angle System**—application of panels to effectively reduce nail pops and angle cracking which may result from stresses at intersections of walls and ceilings.

Double Layer—systems have a face layer of SHEETROCK brand Gypsum Panels job-laminated to a base layer of gypsum panels and/or nailed

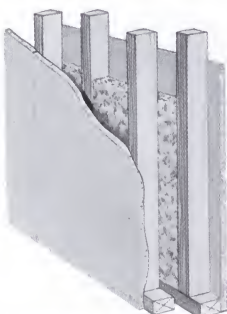
or screw-attached through base layer directly to wood framing in walls and ceilings. Because laminated systems minimize the use of mechanical fasteners in the face layer, finer appearance results—along with greater strength, fire and sound resistance. Adhesive lamination of face layer to base layer, when both are gypsum panels, is by either of two methods: **(a) strip lamination**—a SHEETROCK Setting-Type Joint Compound or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed applied in vertical strips 24" o.c. and supplementary 1 1/2" Type G screws, or **(b) sheet lamination**—adhesive applied over the entire panel surface with supplementary Type G screws or temporary supports until adhesive dries.

When a fire rating is not required, contact bonding of face layer with adhesive is preferred. Either laminating adhesive (notched-spreader applied) or liquid contact adhesive (roller-applied) is used with fasteners 16" o.c. at top and bottom of wall panels and perimeter fasteners 24" o.c. on ceilings.

These assemblies are completed with a United States Gypsum Company joint treatment system and decorating. In walls, however, when predecorated TEXTONE Vinyl-Faced Gypsum Panels are adhesively applied, joint treatment is not required (see folder SA-928).

Three alternate framing methods with wood studs spaced 16" o.c. provide load-bearing assemblies developed to meet fire resistance and sound control requirements in partitions:

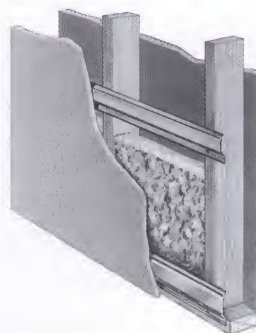
- 1 Conventional 2x4 stud construction, two layers 5/8" SHEETROCK brand Gypsum Panels, FIRECODE Core, or 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, over base layer of 1/4" regular panels on each exposed face. These offer higher sound and/or fire ratings than did the original double wall assembly employing two layers of 5/8" regular panels.
- 2 Double row of 2x3 staggered studs set on separate plates 1" apart, with single layer of 5/8" SHEETROCK brand Gypsum Panels, FIRECODE Core, on each exposed face and 3" THERMAFIBER Sound Attenuation Fire Blankets in the cavity. This provides sound isolation of 54 STC and one-hour fire resistance rating where required. With 2x4 staggered studs on a common 2x6 plate and double layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, 2-hour fire resistance rating is obtained.
- 3 Double row of 2x4 studs set on separate plates 1" apart and double layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, offer sound isolation of 51 STC, 2-hour fire resistance and chase space required for party walls in garden apartments. With 3 1/2" blankets in one cavity, sound attenuation increases to 56 STC.



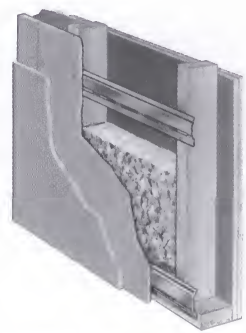
Single-layer staggered stud partition



Double-layer partition (sys. ref. J)



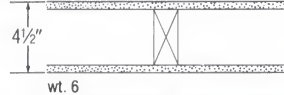
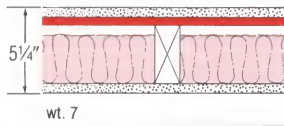
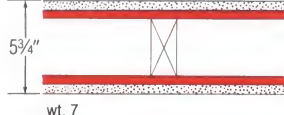
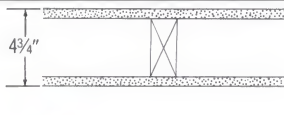
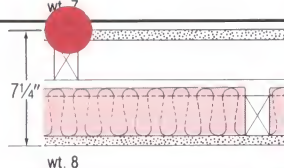
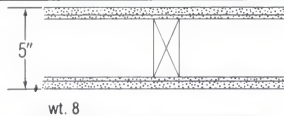
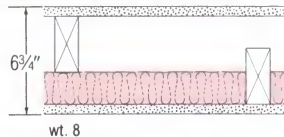
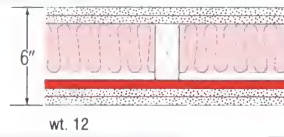
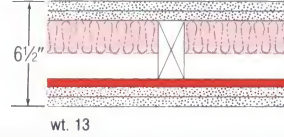
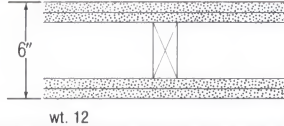
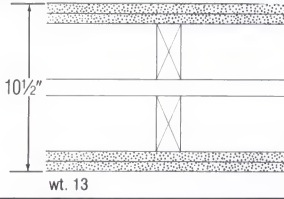
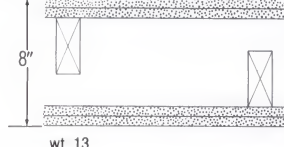
Single-layer resilient partition (sys. ref. B)



Double-layer resilient partition (sys. ref. H)

Partition Applications

 **Insulation.**
 **RC-1™ Resilient Channels.**

Fire rating	Fire-rated construction detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
45 min.		Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— 2×4 16" o.c.—panels nailed 7" o.c.— $\frac{1}{8}$ " cem ctd nails—joints exp or fin— UL Des U317	N/A		A
1 hr.		Wd Stud—resil partition— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— 2×4 16" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—panels att with 1" Type S screws—opp side direct att with $1\frac{1}{4}$ " Type W screws—end joints back-blocked with RC-1 chan—joints fin—perimeter caulked— UL Des U311	50	BBN-760903	B
1 hr.		Wd Stud—resil partition— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— 2×4 16" o.c.—RC-1 chan both sides spaced horiz 24" o.c.—panels att with 1" Type S screws—joints fin—perimeter caulked— T-1396-OSU	41	Based on RC-1 channel one side only— USG-860802	C
1 hr.		Wd Stud— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core— 2×4 16" o.c.—panels nailed 7" o.c.— $\frac{1}{8}$ " cem ctd nails—joints exp or fin—perim caulked— UL Des U314 based on 24" stud spacing, joints fin	34 37 46	Based on 16" stud spacing and screws 6" o.c.— USG-30-F1-G&H Based on 24" stud spacing— USG-860807 Based on 24" stud spacing & 3" SAFB— BBN-700725	D
1 hr. est		Stag Wd Stud— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core— 2×3 non-load bearing studs 16" o.c.— 2×3 plates 1" apart—panels nailed 7" o.c.—3" THERMAFIBER SAFB one side—joints fin—perim caulked—est. fire rating based on UL Des U305	54	Based on SHEETROCK brand gypsum panels, FIRECODE C core, and on screws or nails 7" o.c.— TL-77-149	E
1 hr. est		Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— 2×4 16" o.c.—2 layer—base layer $\frac{1}{4}$ " SHEETROCK brand gypsum panels appl vert with 4d ctd nails— $\frac{1}{2}$ " panel face layer strip lamin—joints stag & fin—perimeter caulked—est. fire rating based on UL Des U305	45 53	TL-69-52 Based on $\frac{5}{8}$ " lamin, FIRECODE core face layers & $1\frac{1}{2}$ " SAFB— USG-221-ST-G&H	F
1 hr. est		Stag Wd Stud— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— 2×4 16" o.c. on 2x6 com plate—panels att with 6d ctd nails 7" o.c.—2" THERMAFIBER SAFB one side—perim caulked—joints fin—est. fire rating based on UL Des U305	45	Based on FIRECODE core panels— TL-69-213	G
1 hr. est		Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— 2×4 16" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—end joints back-blocked with RC-1 chan—joints fin— UL Des U334	59 49	TL-67-239 Based on same construction without SAFB— TL-67-212	H
2 hr.		Wd Stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side— 2×4 16" o.c.—2" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—resil layers perim caulked—joints fin— T-4799-OSU	58 52	USG-810219 Based on same assembly (non-rated) without SAFB— USG-810218	I
2 hr.		Wd Stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE core, or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core, ea side— 2×4 16" o.c.—base layer att with $1\frac{7}{8}$ " nails 6" o.c.—face layer att with $2\frac{3}{8}$ " nails 8" o.c.—joints exp or fin— UL Des U301	N/A		J
2 hr. est		Wd Stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2 rows 2×4 16" o.c. on sep plates 1" apart—base layer att with 6d ctd nails 16" o.c.—face layer att with 7d ctd nails 7" o.c.—perim caulked—joints fin—est. fire rating based on UL Des U301	51 56	TL-69-214 Based on $3\frac{1}{2}$ " thick insulation in one cavity— USG-710120	K
2 hr. est		Stag Wd Stud—2 layers $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core— 2×4 16" o.c. on 2x6 com plate—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin—est. fire rating base on UL Des U301	47	TL-69-211	L

Wall Furring Applications

Detail & physical data	Description	Comments	
	SHEETROCK Z-Furring Channels 24" o.c.—THERMAFIBER fire safety FS-15 blankets between channels—1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached—joints finished	System suitable for up to 3" thick insulation; good vapor retarder, no limiting height	M
	Wood furring strips 16" o.c.—1/2" SHEETROCK brand gypsum panels, foil-back—joints finished	Surface not isolated from structural stresses	N

For ceiling applications, see page 8.

Exterior Wall Applications

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Comments	
1 hr.		Wd Stud—5/8" SHEETROCK brand gypsum panels, FIRECODE C core, interior—1" extruded polystyrene insul sheathing and 1/2" plywd siding—2x4 16" o.c.—3 1/2" THERMAFIBER fire safety FS-15 blankets—sheathing appl horiz with 1 1/2" galv nails 12" o.c.—gypsum panels appl vert with 6d cem ctd nails 7" o.c.—joints fin— CEG 12-5-79	Rating applicable to fire exposure on interior face only.	O
2 hr.		Wd Stud—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, interior—1/2" gypsum sheathing and 4" brick masonry veneer exterior—2x4 16" o.c.—sheathing appl horiz with 11d galv nails 6" o.c.—gypsum panels appl horiz or vert with nails 8" o.c.—joints stag & fin— UL Des U302†		P

†Fire rating also applies with IMPERIAL FIRECODE C Base and veneer finish interior surface.

Sound Transmission Loss—db

System reference (p.3)	Test no.	Method	Band center frequency—Hz																STC
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
H	TL-67-239	Lab	35	41	47	53	56	57	59	60	61	63	64	65	65	64	59	61	59
I	USG-810219	Lab	39	42	48	51	53	56	57	57	60	60	60	62	57	58	59	61	58
K	USG-710120	Field	43	40	46	49	48	49	51	54	56	59	60	64	66	66	65	71	56
E	TL-77-149	Lab	31	38	39	45	50	52	55	57	57	57	59	58	57	55	55	57	54
F	USG-221-ST-G&H	Lab	30	37	42	47	48	48	48	51	55	57	58	59	59	57	59	62	53
I	USG-810218	Lab	38	31	38	45	49	53	52	54	56	57	58	59	53	55	58	62	52
K	TL-69-214	Lab	31	35	34	39	44	48	51	53	56	56	59	57	50	53	59	59	51
B	BBN-760903	Lab	26	30	36	42	45	47	50	55	56	57	57	57	55	51	54	58	50
H	TL-67-212	Lab	26	30	33	39	42	47	49	52	55	57	60	61	61	58	53	56	49
L	TL-69-211	Lab	30	33	35	40	40	42	44	46	49	51	52	52	48	48	53	57	47
F	TL-69-52	Lab	21	28	34	35	39	41	41	46	49	51	54	56	55	53	52	55	45
G	TL-69-213	Lab	25	31	35	37	41	40	40	43	46	46	51	51	47	47	51	54	45
D	USG-860807	Lab	25	20	34	37	33	32	37	36	40	42	44	45	38	34	36	41	37

Resilient Attachment—SHEETROCK brand Gypsum Panels are screw-attached to RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) which are screw-attached 24" o.c. to the framing. The galvanized steel channels "float" the panels away from the framing; provide a spring action that isolates the gypsum panel surface. These systems combine highly effective sound isolation with lightweight low-cost construction.

An excellent value in wood frame party walls consists of single-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, resiliently attached to one side of studs and directly attached to the other side, plus 3" THERMAFIBER SAFB pressed tightly into the stud cavity. This lightweight partition is widely used for its high sound value, STC 50, at costs which are little more than for conventional partition systems. (Use of a filler strip at the base may reduce STC rating.) It also offers 1-hour rated fire resistance; often chosen for use between units in garden apartments.

Where exceptional sound control, greater fire resistance and strength are required, double-layer drywall construction is used with THERMAFIBER SAFB and RC-1 Resilient Channels applied one side of wood studs (see table, above).

Area Separation Walls—fast-erecting non-load bearing drywall partitions for low-cost fire barriers in wood-frame multi-family housing (see separate Systems Folder SA-925).

Wall Furring—SHEETROCK brand Gypsum Panels, Foil-Back, provide an economical, efficient vapor retarder and a readily decorated interior surface for exterior walls. Panels are attached to wood furring strips 16" o.c. or screw-attached to SHEETROCK Z-Furring Channels 24" o.c. The channels mechanically attach THERMAFIBER Fire Safety FS-15 Blankets or rigid foam insulation to the interior of exterior walls. The system provides a self-furring solid backup for SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to the channels.

Renovation—1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to SHEETROCK Z-Furring Channels with THERMAFIBER SAFB between channels, improve the sound control of wood stud

plaster walls. With 3" channels and 2" blankets, the assembly provides 50 STC sound rating.

Gypsum panels for these assemblies are available in five thicknesses and nine types. SHEETROCK brand Gypsum Panels, FIRECODE Core, and SHEETROCK brand Gypsum Panels, FIRECODE C Core, with a specially formulated core, obtain higher fire-resistance ratings than regular panels. SHEETROCK brand Gypsum Panels, Water-Resistant, are recommended as a tile base for tub and shower areas. SHEETROCK brand Exterior Gypsum Ceiling Board offers superior weather-and-sag-resistance plus excellent paintability in exterior soffits.

Gypsum panels are easily screw-applied to channel-type corrosion-resistant steel studs. See SA-923 Drywall/Steel Framed Systems in this series for details.

Limitations

- 1 SUPER-TITE or Buildex Type S Screws must be used for attachment of single-layer panels to RC-1™ Resilient Channels.
- 2 Resilient channels must be attached with 1¼" SUPER-TITE or Buildex Type W or Type S Screws. Nails must not be used.
- 3 Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting "Wood Framing Requirements" shown in Gypsum Panels Product Folder SA-927.
- 4 Direct attachment to wood framing with fastener penetration into wood exceeding 1" is not recommended except where required to meet fire rating.
- 5 Maximum resilient channel spacing: ceilings—24" o.c. for joists 16" o.c.; 16" o.c. for joists 24" o.c. Sidewalls—24" o.c. Also see support spacing limitations on right.
- 6 SHEETROCK brand Gypsum Panels should not be exposed to excessive or continuous moisture and extreme temperature. Specially formulated SHEETROCK brand Gypsum Panels, Water-Resistant, are recommended as a base for wall tile in bathrooms and other high moisture areas, but they are not recommended for areas subject to constant moisture such as

gang showers and commercial food processing. Durock Interior Cement Board is recommended as a ceramic tile base under these conditions.

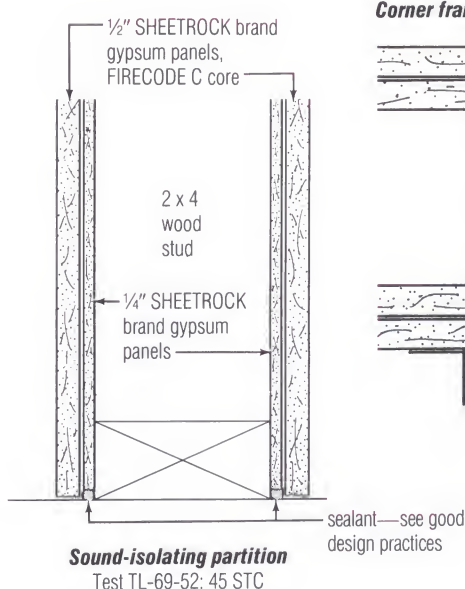
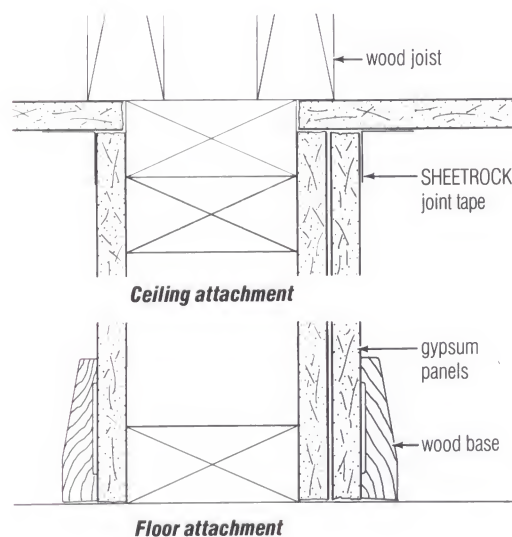
- 7 Maximum support (studs, joists, channels, furring) spacing for gypsum panels:

Panel thickness ⁽¹⁾	Location	Application method ⁽²⁾	Max. support spacing o.c.	
Single-Layer Application			in	mm
3⁄8" (9.5 mm)	ceilings ⁽³⁾	perpendicular ⁽⁴⁾	16	406
	sidewalls	parallel or perpendicular	16	406
1⁄2" (12.7 mm)	ceilings	parallel ⁽⁴⁾	16	406
		perpendicular	24 ⁽⁵⁾⁽⁶⁾	610
	sidewalls	parallel or perpendicular	24	610
5⁄8" (15.9 mm)	ceilings ⁽⁶⁾	parallel ⁽⁴⁾	16	406
		perpendicular	24	610
	sidewalls	parallel or perpendicular	24	610
Double-Layer Application				
3⁄8" (9.5 mm)	ceilings ⁽⁷⁾	perpendicular	16	406
	sidewalls	perpendicular or parallel	24 ⁽⁸⁾	610
1⁄2" & 5⁄8" (12.7 & 15.9 mm)	ceilings	perpendicular or parallel	24 ⁽⁸⁾	610
	sidewalls	perpendicular	24 ⁽⁸⁾	610

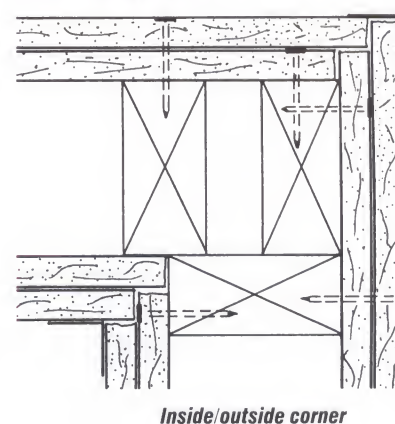
(1) A ⅝" thickness is recommended for the finest single-layer construction, providing increased resistance to fire and transmission of sound; ½" for single-layer application in new residential construction and remodeling; and ¾" for repair and remodeling over existing surfaces. (2) Long edge position relative to framing. (3) Not recommended below unheated spaces. (4) Not recommended if water-based texturing material is to be applied. (5) Max. spacing 16" if water-based texturing material to be applied. (6) If ½" SHEETROCK brand Interior Gypsum Ceiling Board is used in place of gypsum panels, max. spacing is 24" o.c. for perpendicular application with weight of unsupported insulation not exceeding 1.3 psf., 16" o.c. with weight not exceeding 2.2 psf. (7) Adhesive must be used to laminate ⅝" board for double-layer ceilings. (8) Max. spacing 16" o.c. if fire rating required.

- 8 These assemblies are not recommended for exterior soffits and ceilings which project upwards and away from the building proper.

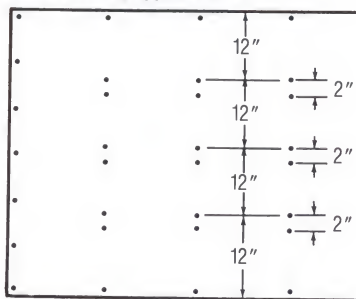
Details/Partitions



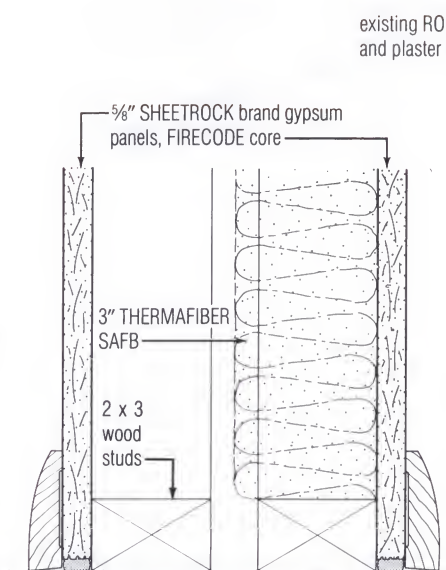
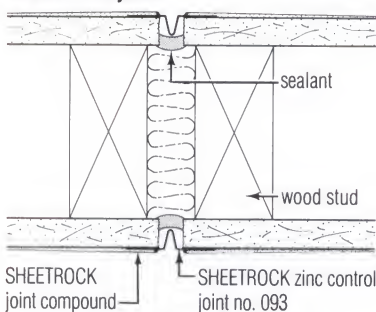
Corner framing details



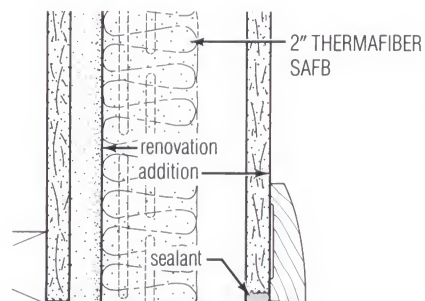
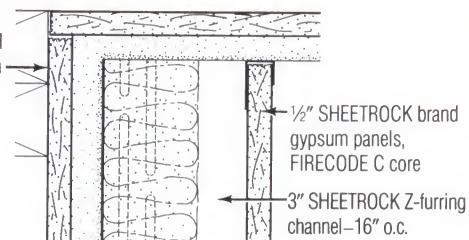
Double nailing application



Wall control joint

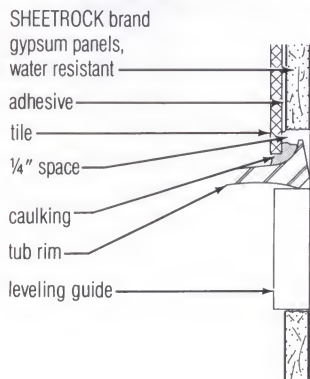


Sound-isolating chase wall partition
Test TL-77-149: 54 STC

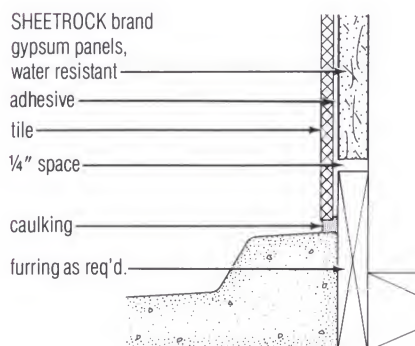


Partition renovation
Test USG-811101:50 STC

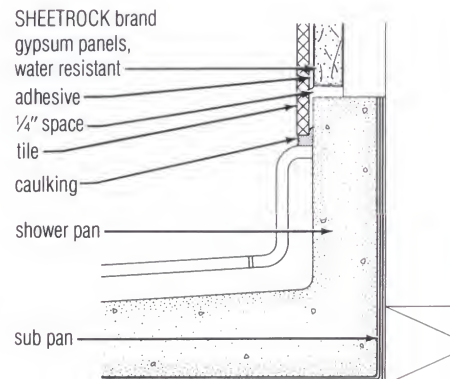
Tub and shower details—SHEETROCK brand gypsum panels, water resistant single-layer panels



Tub

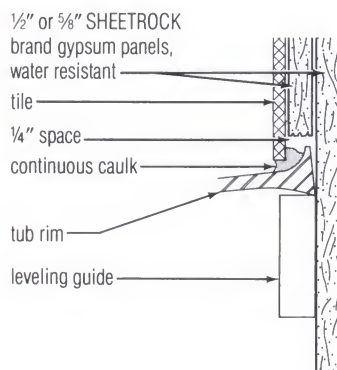


Shower receptor

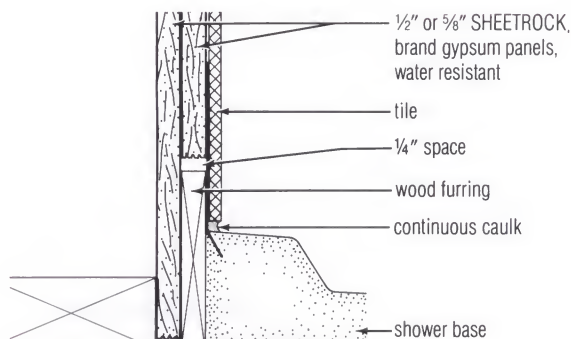


Shower pan

Double-layer panels

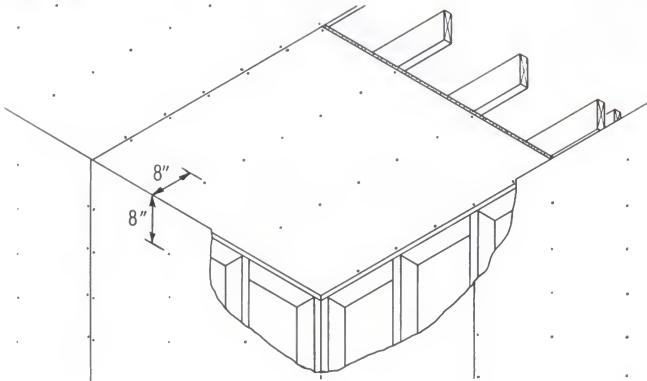


Tub

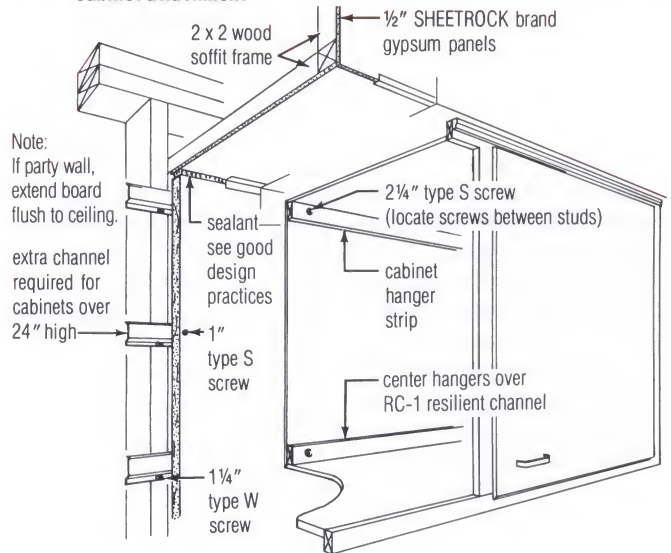


Shower receptor

Floating interior angle system



Cabinet attachment

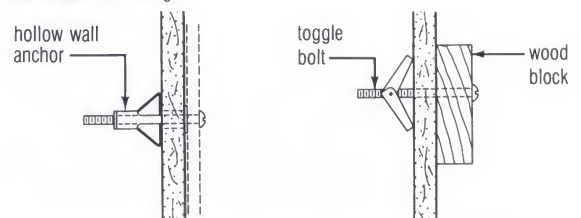


Fastener load data

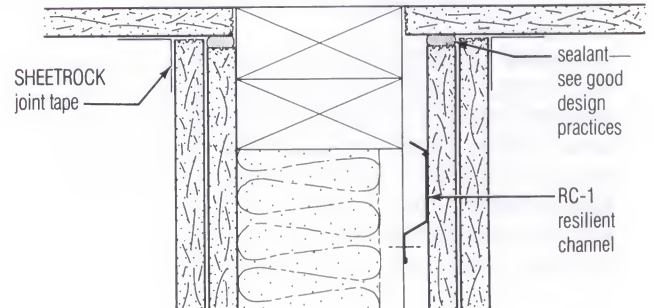
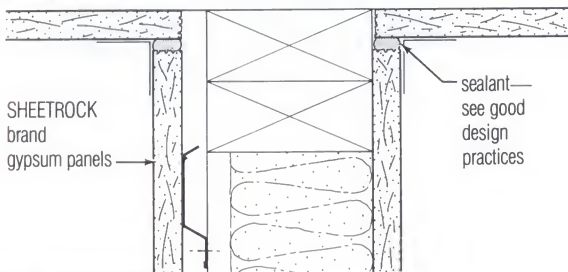
Fastener type	Size		Base assembly	Allow. withdrawal resistance		Allow. shear resistance	
	in	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
hollow wall anchor or toggle bolt	1/8	3.18	1/2" gypsum panel	20	89	40	178
	3/16	4.76		30	133	50	222
	1/2	6.35		40	178	60	267

(1) Newtons

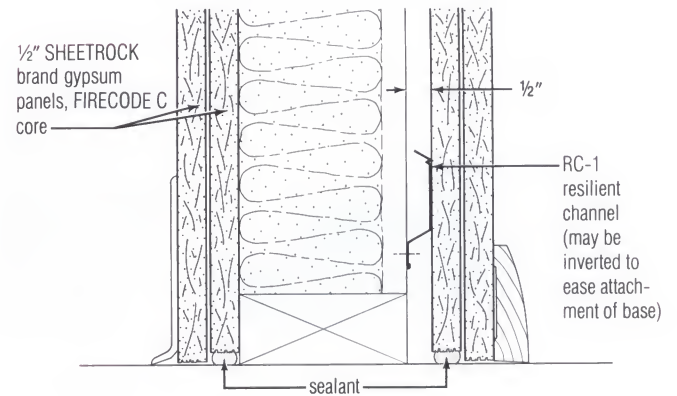
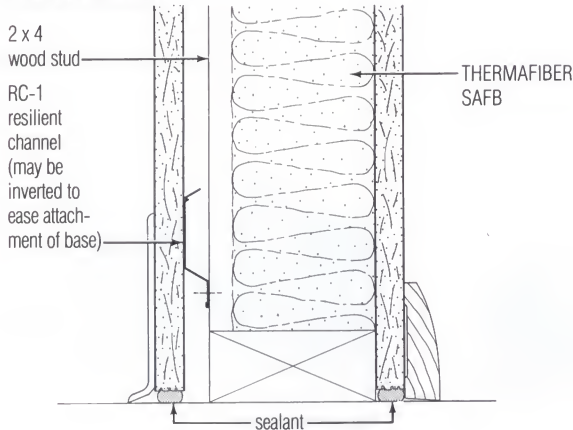
Fixture attachments—light



Ceiling attachments



Floor attachments



In single-layer ceiling assemblies, SHEETROCK brand Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6" to 7" o.c. (6" for fire-rated construction); 1 1/4" Type W screws are spaced 12" o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing.

Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1™ Resilient Channels are screw-attached across wood joists; gypsum panels are attached to channels with Type S screws. A one-hour fire rating is available with 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

New USG High Performance Floor/Ceiling Systems achieve a 2-hour fire resistance rating (UL Design L541) and deliver STC/MTC ratings as high as 60/54, IIC ratings as high as 62. Floors consist of 1" SHEETROCK brand Gypsum Liner Panels over 1/2" plywood and are finished in one of two ways: (1) ceramic tile over 1/2" DUROCK Exterior Cement Board, or, (2) vinyl tile or carpet/pad over 1/2" oriented strand board. Ceilings consist of two layers 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, applied over RC-1 Resilient Channels. Installed within the cavity are 3" THERMAFIBER SAFB. See data sheet WB-1868 for complete information.

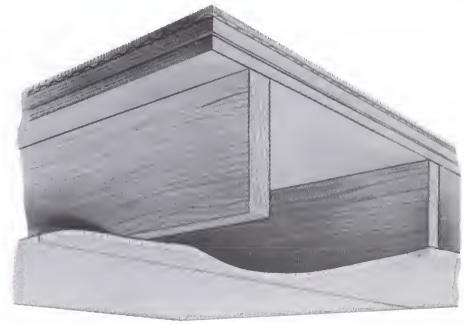
When additional ceiling space is needed to accommodate large ducts or pipes, gypsum panels are screw-attached below a direct suspension system. This direct-hung steel ceiling grid consists of main beam runners 4' o.c. and cross furring channels spaced 24" o.c. A cross beam supports the edge of lighting fixtures. With 1/2" or 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to this grid, a one-hour fire-rated wood joist floor/ceiling is provided. The assembly includes provision for lighting fixtures, air ducts and dampers.

When water-based spray texture paint will be applied, 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is ideal because it supports both the sprayed texture and insulation like 5/8" thick panels but at less cost.

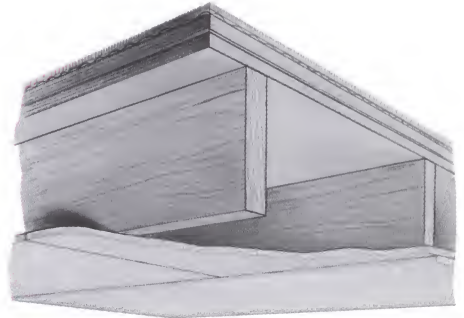
Renovation—To improve the sound control of wood framed floor-ceilings, 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, are screw-attached to 2" SHEETROCK Z-Furring Channels fastened to bottom of joists. With 2" THERMAFIBER SAFB between channels, the system provides 45 STC and 40 IIC ratings (see detail, page 11).

Exterior Soffits—eaves, canopies, carports and other exterior soffits with indirect exposure to the weather are quickly and economically completed with SHEETROCK brand Exterior Gypsum Ceiling Board fastened directly to joists (see United States Gypsum Company Bulletin WB-1152 for detailed specification). Maximum frame spacing and other limitations for these systems are shown on page 5.

Single-layer ceiling
(sys. ref. A)



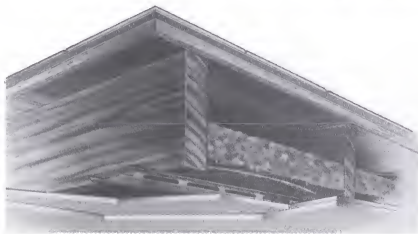
Double-layer ceiling



Resilient channel with blankets
(sys. ref G)

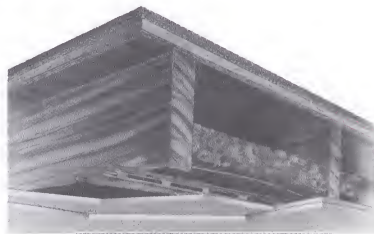


USG High Performance Floor Ceiling Systems (sys. ref. P)



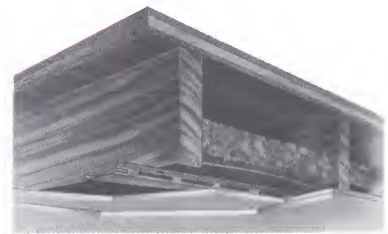
**Ceramic Tile over
Durock Exterior Cement Board
Floor/Ceiling Assembly**

STC: 60 MTC: 54 IIC: 52




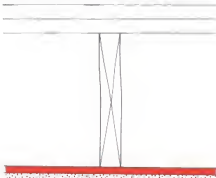

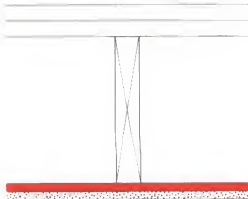
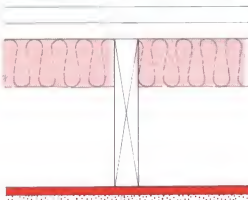
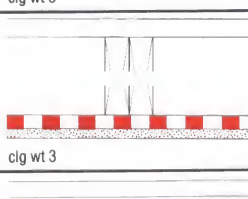
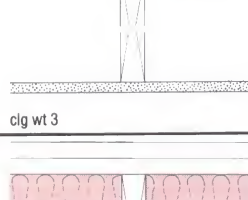

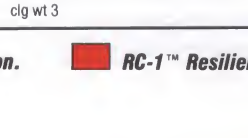
**Vinyl Tile over
Oriented Strand Board
Floor/Ceiling Assembly**

STC: 58 MTC: 53 IIC: 51



**Carpet/Pad over
Oriented Strand Board
Floor/Ceiling Assembly**

STC: 59 MTC: 54 IIC: 62

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin— UL Des L512	N/A			A
	clg wt 3					
1 hr.		Resil ceiling—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin— UL Des L514	N/A			B
	clg wt 3					
1 hr.		Resil ceiling—5/8" SHEETROCK brand gypsum panels, FIRECODE C core—1 3/8" perlite-sand conc over 3/8" plywd sub-floor—2 x 10 wd joist 16" o.c.—3" glass fiber batts betw joists—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin— UL Des L516	59		Based on 3/4" gypsum concrete and 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— USG 740704	C
	clg wt 3			47	Based on vinyl tile atop flooring— USG 740703	
				65	Based on 44-oz. carpet & 40-oz. pad atop flooring— USG 740705	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/4" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	47	39	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-6	D
	clg wt 3		47	39	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-10	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/4" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	47	67	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-7	E
	clg wt 3		48	66	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-9	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/4" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	51	46	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-9	F
	clg wt 3		50	46	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-3	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/4" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	52	71	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-8	G
	clg wt 3		51	70	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-4	
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—single 4 x 10 wd joist 48" o.c.—met fur chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin— UL Des L508	N/A			H
	clg wt 3					
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin— UL Des L501	38	32	CK-6412-7	I
	clg wt 3		39	56	Based on 44-oz carpet & 40-oz pad atop flooring— CK-6412-8	
1 hr. est		5/8" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—panels att with 6d nails 6" o.c.—joints fin—est. fire rating based on UL Des L501	41	32	CK-6412-6	J
	clg wt 3		40	58	Based on 44-oz carpet & 40-oz pad atop flooring— CK-6412-5	
1 hr.		1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—susp grid with main run 4" o.c. and cross tees 2" o.c.—panels screw-att below grid—joints fin— UL Des L525	N/A			K
	clg wt 3					



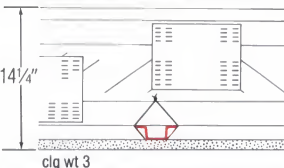
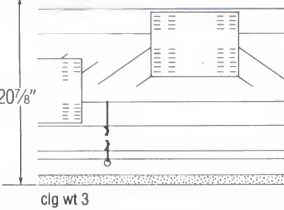
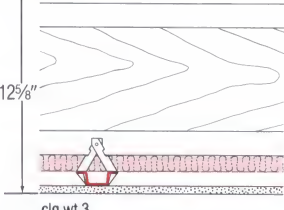
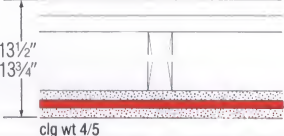
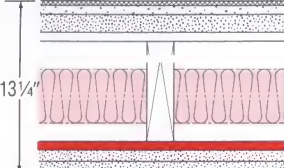
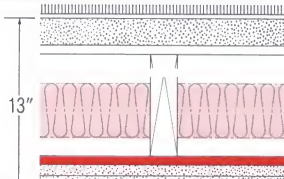
Insulation.



RC-1™ Resilient Channels.



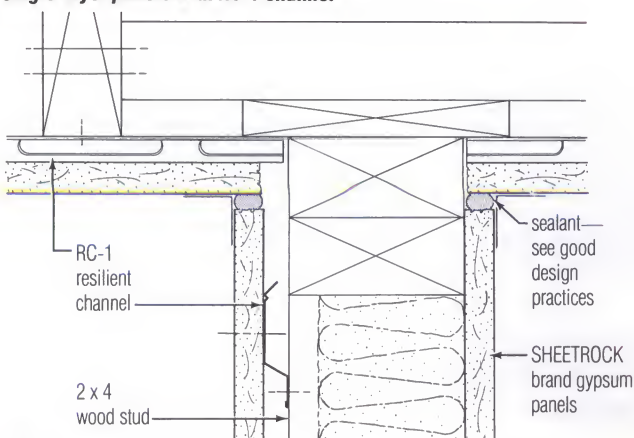
Furring Channels.

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance			System reference
			STC	IIC	Description & test no.	
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling— 2x12 wd truss of 2x4 lbr secured with steel truss plates— trusses 24" o.c.—3/4" nom plywd flr—met fur chan 24" o.c. wire-tied to trusses—panels att with 1" Type S screws 12" o.c.— joints fin— UL Des L528	N/A			L
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling— 2x12 wd truss of 2x4 lbr secured with steel truss plates— trusses 24" o.c.—3/4" nom plywd flr—susp grid with main run 4" o.c. and cross tees 2" o.c.—panels att with 1" Type S-12 screws 12" o.c.—joints fin— UL Des L529	N/A			M
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—3/4" T&G plywd flr—10" I-shaped wd joist 24" o.c.—met fur chan 24" o.c. clip-att to joist—1" THERMAFIBER insul laid over chan below joists— panels screw att to chan 12" o.c.—joints fin— UL Des L530 based on Trus Joist members— UL Des L531 based on Timjoist, Inc. Type TMI members	47	40 54 43	TL-81-87—IN-81-16 Based on carpet & pad atop flooring— IN-81-17 Based on cushioned vinyl atop flooring— IN-81-19	N
1 1/2 hr. 2 hr.		Resil ceiling—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw-att over base layer panels—face layer screw att to chan 12" o.c.—joints fin— UL Des L510 —2 hr. sys. with 5/8" SHEETROCK brand gypsum panels, FIRECODE C core— UL Des L511	N/A		Assembly not recommended when sound control is a major consideration	O
2 hr.		Floor/ceiling—floor of 8"x8" ceramic tile, 1/2" DUROCK exterior cement board, 1" SHEETROCK brand gypsum liner panels, 1/2" plywood—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	60 58 59	52 51 62	RAL-TL89-141 (54 MTC)— RAL-IN89-5 Based on vinyl tile over oriented strand board in place of ceramic tile and cement board— RAL-TL89-145 (53 MTC)— RAL-IN89-7 Based on carpet/pad over oriented strand board in place of ceramic tile and cement board— RAL-TL89-146 (54 MTC)— RAL-IN89-8	P
2 hr.		Floor/ceiling—floor of carpet/pad, 1 1/2" Type F flooring, 1/2" plywood—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	59 59	69 37	RAL-TL90-40 (54 MTC)— RAL-IN90-5 Based on vinyl tile in place of carpet/pad— RAL-TL90-40 (54 MTC)— RAL-IN90-6	Q

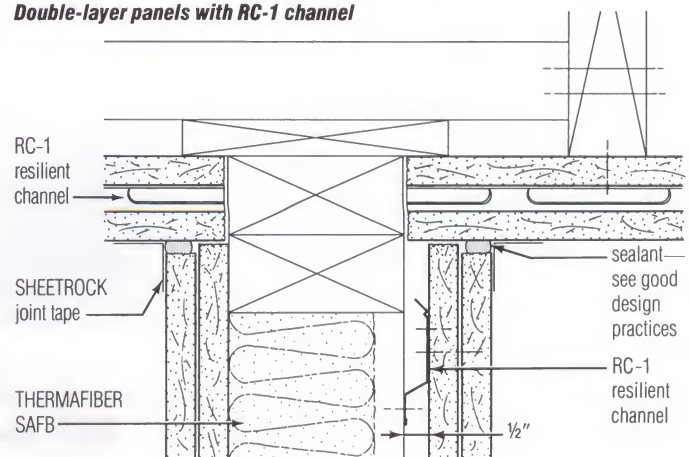
 Insulation.  RC-1™ Resilient Channels.  Furring Channels.

UL Designs L510 and L511

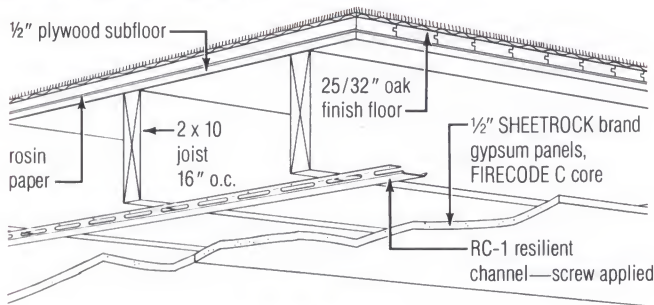
Single-layer panels with RC-1 channel



Double-layer panels with RC-1 channel

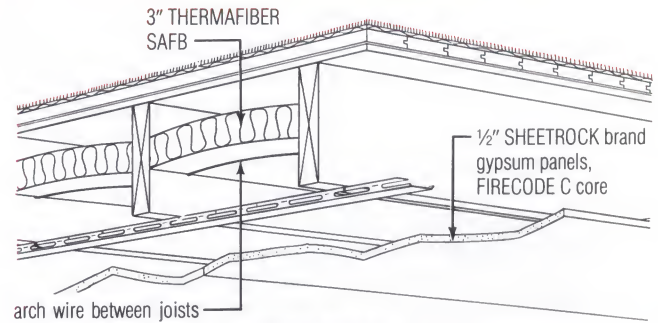


Ceiling and floor assemblies



Test CK-6512-7

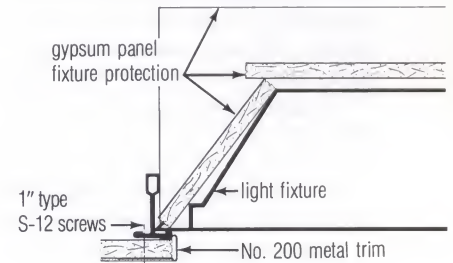
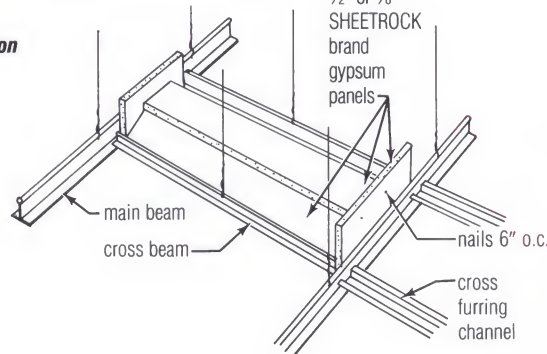
Test CK-6512-6—same but without carpet & pad



Test CK-6512-8

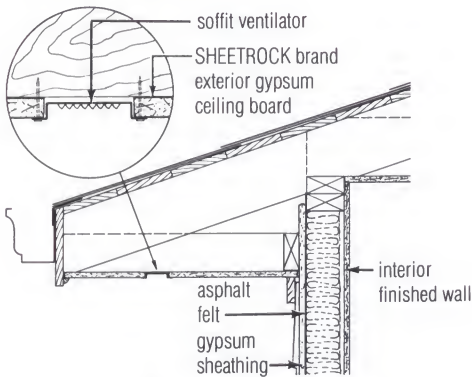
Test CK-6512-9—same but without carpet & pad

Light fixture fire protection

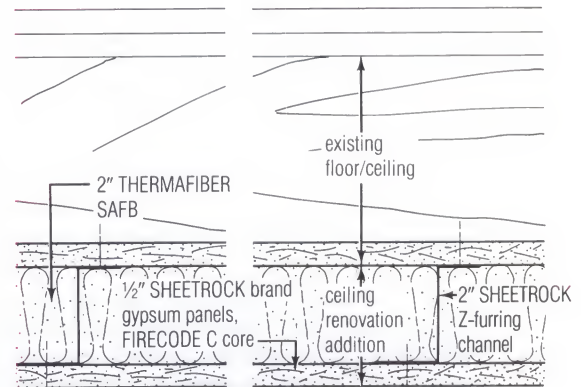


Lighting fixture

Exterior walls & soffit



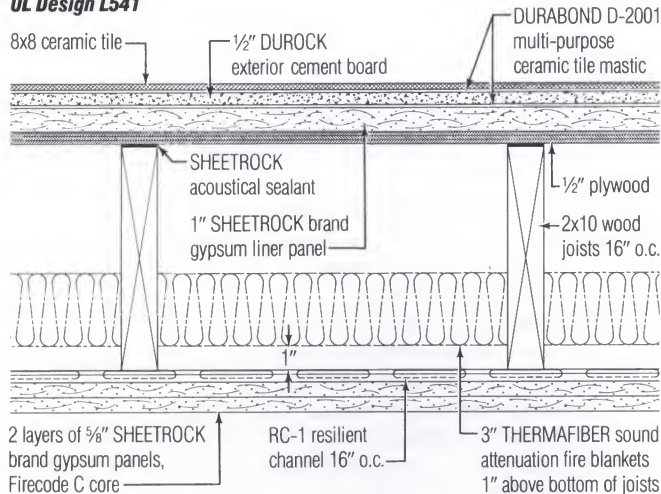
Mineral shingle exterior



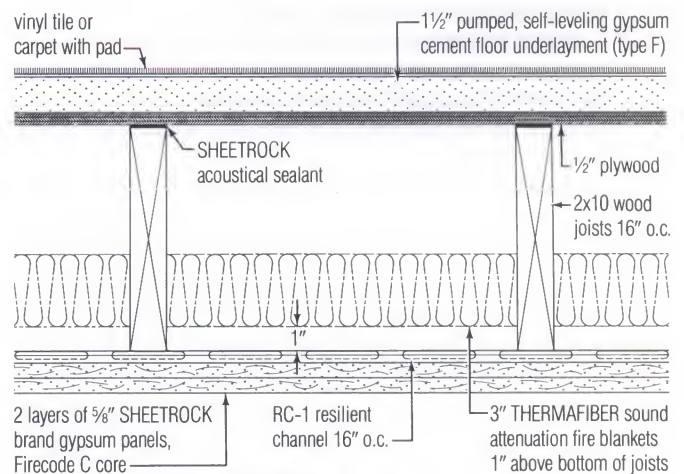
Ceiling renovation

Test USG-800107: 45 STC
USG-800108: 40 IIC

UL Design L541



Ceramic tile over DUROCK exterior cement board and SHEETROCK brand gypsum liner panels



Vinyl tile or carpet/pad over type F flooring

1 System Performance—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.

2 Control Joints—Gypsum panel surfaces should be isolated with control joints or other stress relief where: **(a)** partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; **(b)** ceiling abuts a structural elements, dissimilar wall or partition or other vertical penetration; **(c)** construction changes within the plane of the partition or ceiling; **(d)** partition or furring run exceeds 30'; **(e)** ceiling dimensions exceed 50' in either direction with perimeter relief, 30' without relief; **(f)** exterior soffits exceed 30' in either direction; **(g)** wings of "L", "U" and "T"-shaped ceiling areas are joined; **(h)** expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints. Less-than-ceiling height frames should have control joints extending to the ceiling from both corners. Treat window openings in same manner as doors.

Gypsum panel surfaces should not be firmly anchored across the flat grain of wide dimensional lumber such as floor joists and headers. Float panels over these members using resilient channels or provide a control joint to counteract wood shrinkage.

3 Penetrations of the gypsum panel diaphragm, such as borrowed lights, access panels, light troffers, require additional reinforcement at corners to distribute concentrated stress if a control joint is not used.

4 Sound tests are conducted under ideal laboratory conditions per ASTM procedures. Comparable field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with 1/4" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction.

5 TEXTONE Vinyl-Faced Panels—For adhesive applications only water-based adhesives are recommended; other adhesives may not be compatible with the vinyl surface.

Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall and the resultant damage to vinyl covering.

6 Air, Water and Vapor Control—Flashing and sealants as shown in the construction documents and as selected by the architect and/or structural engineer should be provided to resist air and water infiltration. The flashing and sealants selected shall be installed in a workmanlike manner in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall. All gypsum sheathing must be covered with No. 15 asphalt felt or Tyvek Housewrap sheet to assure watertight construction. Asphalt felt should be applied horizontally with 2" overlap and attached to sheathing. Tyvek sheets should be stapled to sheathing according to manufacturer's directions. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c.

Vapor retarder is normally installed on the warm side of wall in cold climates to prevent interior moisture from entering the stud cavity. Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall. Vinyl wall coverings are not recommended for the interior of walls containing vapor retarders.

7 Ceramic Tile—SHEETROCK brand Gypsum Panels, Water-Resistant, or DUROCK Interior Cement Boards are recommended as a base for adhesive application of ceramic and plastic tile and plastic-faced wall panels. A vapor retarder is not recommended.

Although taping and finishing of SHEETROCK brand Gypsum Panels, Water-Resistant, is not required under tile, for best results and to improve the integrity of the finished wall, we recommend that all joints and fastener heads be treated with SHEETROCK 45 or 90 Setting-Type Joint Compound. The compound should also be used to embed tape beyond areas to be tiled. These areas should be finished with conventional joint systems.

8 Wood Framing Requirements—Wood framing meeting the minimum requirements of local building codes is necessary for proper performance.

9 Ceilings—To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for 1/2" thick panels with frame spacing 24" o.c.; 2.2 psf for 1/2" panels on 16" o.c. framing and 3/8" panels on 24" o.c. framing. Foil-back panels or a separate vapor retarder should be installed in all roofed ceilings, and the plenum or attic space vented with a min. 1/2-sq. in. net free vent area per sq. ft. of horizontal surface.

Water-based texturing materials applied to ceilings should be completely dry before insulation and vapor retarder are installed. Under most conditions, drying takes several days; i. e., 10% R.H. and 90°F conditions require 1.5 days; 90% R.H. and 90°F require 10.5 days; 30% R.H. and 60°F require 5.3 days.

10 Back-Blocking—Ridging or deformation at the panel joints may occur in gypsum board construction under adverse job or weather conditions. Back blocking end joints will minimize joint ridging and is recommended. Where back-blocking is used, float the end joints between supports and back-block with a 8" wide strip of gypsum board the full length of the joint adhesively applied over abutting ends. For fire-rated resilient construction, back butt-end joints with RC-1™ Resilient Channels. Refer to Gypsum Construction Handbook for complete details.

11 Fixture Attachment—Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.

12 Double-Layer Laminated 3/8" Panels—In this assembly, use scaffold nails driven through gypsum blocks into the framing at three points vertically, or temporary shoring. The 1 1/2" Type G screw is not recommended.

13 Acoustical Tile—Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.

14 SHEETROCK brand Exterior Gypsum Ceiling Board—Exposed surfaces should receive two coats of good quality exterior paint. First coat: oil-based primer; second coat: either alkyd or latex exterior paint.

15 Shadowing—During periods of low outside temperature, airborne dirt may collect, producing photographing or shadowing over fasteners and furring of exterior walls. This natural phenomenon occurs through no fault of the products.

16 WARNING: COMBUSTIBLE. Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.

17 Additional Information—See technical folders in this series: Construction Selector SA-100 for fire and sound-rated systems; Gypsum Panels & Accessories SA-927 for information on system components; Texture and Finish Products SA-933 for finishing product specifications; DUROCK Interior Cement Board Folder SA-932 for data on ceramic tile base.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- A Gypsum Board**—48" wide—(1/4") (3/8") (1/2") (5/8") thick (Regular) (Foil-Back) SHEETROCK brand Gypsum Panels; (1/2") (5/8") thick (Foil-Back) SHEETROCK brand FIRECODE (C) Gypsum Panels; (1/2") (5/8") thick TEXTONE (FIRECODE) Gypsum Panels (type) (finish); (1/2") (5/8") thick SHEETROCK brand Gypsum Panels, Water-Resistant; (1/2") thick SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C; (5/8") thick SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE; (1/2") (5/8") thick SHEETROCK brand (FIRECODE) Exterior Gypsum Ceiling Board; 1/2" thick SHEETROCK brand Interior Gypsum Ceiling Board—lengths as required.
- B Sheathing**—(1/2") (5/8") SHEETROCK brand Gypsum Sheathing; (5/8") SHEETROCK brand Gypsum Sheathing, FIRECODE; 0.4" (1/2") (5/8") GYP-LAP (Type X) Gypsum Sheathing.
- C Joint Treatment**—(select a United States Gypsum Company Joint System).
- D Adhesive**
 - (for Back-Blocking and Fire-Rated Double-Layer Systems)
 - SHEETROCK Setting-Type Joint Compound or SHEETROCK Joint Compound Ready-Mixed—(All Purpose) (Taping).
 - (for Non-Rated Double-Layer Systems)—Laminating or Liquid Contact Adhesive.
 - (for Adhesive Application)—Drywall Stud Adhesive (must comply with ASTM C557 in partitions.)
 - (for Non-Rated Systems—specify with adhesive above)
 - Vinyl Foam Tape.

E Fasteners

—Screws (1 1/4" Type W) (1 1/2" Type G) (3/8", 1", 1 1/8", 1 1/4", 1 5/8", 1 7/8" Type S) (1" Type S-12).

—(for Non-Rated Systems)—1 1/4", 1 3/8" (Annular Ring Drywall) (Cement Coated Cooler) Nails—obtain locally.

—(for Fire-Rated Systems)—specify from fire test report.

—(for sheathing)—11-ga. (7/16") (1") dia. head galvanized roofing nails (1 1/2") (1 3/4") long—obtain locally.

F SHEETROCK Trim No. (200-A) (401) (402) (P-1) (801-A) (801-B).

G Corner Bead—(No. 103 DUR-A-BEAD) (No. 104 DUR-A-BEAD) (SHEETROCK No. 800) Metal Corner Reinforcement.

H SHEETROCK Zinc Control Joint No. 093.

I RC-1™ Resilient Channel.

J THERMAFIBER Sound Attenuation Fire Blankets (1 1/2") (2") (3")x16" or 24"x48"; THERMAFIBER Fire-Safety FS-15 Blankets (1") (2") (3") (3 1/2") (5 1/4") (6") x 15" or 23" x 48".

K Caulking—SHEETROCK Acoustical Sealant.

Part 3: Execution

3.1 Single-Layer Systems

3.1.1 Gypsum Panel Erection—Direct Attachment

Apply gypsum panels to ceilings first, then to walls. Place panels (perpendicular to framing) (parallel to framing). When using perpendicular application, position all ends over framing members. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses. Place end joints on opposite sides of partitions on different studs. When necessary, cut ends, edges and cutouts within field of panel in a workmanlike manner.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space perimeter fasteners at least 3/8" from ends and edges. Drive nails home with heads slightly below surface of panels to provide a uniform dimple 1/32" deep. Do not use a nail set; avoid breaking face paper.

Attach gypsum panels to framing supports by:

A Standard single nailing method—Attach panels with specified nails spaced 7" o.c. max. for ceilings, 8" o.c. max. for walls.

B Adhesive application—Attach gypsum panels with drywall stud adhesive applied in a continuous 3/8" bead at center of attachment to face of framing members. Where two panels meet on a framing member, apply two beads permitting adhesive contact to both panels. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following panel erection, apply fasteners per manufacturer's directions. Hand impact panel along framing to insure contact at all points.

C Double-nailing method—Attach gypsum panels with nails spaced 12" o.c. with second nails in close proximity (2" away).

D Power-driven screws—Attach gypsum panels with 1 1/4" Type W screws—spaced 16" o.c. max. for walls, 12" o.c. for ceilings.

E Vinyl Foam Tape—Attach gypsum panels, using stud adhesive and 8" tape strips applied according to manufacturer's directions.

3.1.2 Predecorated TEXTONE Vinyl-Faced Gypsum Panel Erection

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically to framing spaced (16") (24") o.c. Position cut panels with cut edge at corner.

Apply drywall stud adhesive in continuous 3/8" beads to face of studs in field of panel and in two 3/8" beads at extreme edges of studs at vertical joints. Position panels within 15 min. after adhesive application and mechanically fasten 16" o.c. along ceiling and floor

edges of panels. Impact panel by hand along framing to insure good contact at all points.

Finish joints, edges, corners with TEXTONE Mouldings matching panel finishes and installed according to manufacturer's directions.

3.1.3 SHEETROCK brand Gypsum Panels, Water-Resistant, Erection

A Framing—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over $\frac{5}{16}$ " thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.

B Gypsum Panels—After tub, shower pan or receptor is installed, place temporary $\frac{1}{4}$ " spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, brush thinned tile adhesive over all cut or exposed panel edges at utility holes, joints and intersections.

Install panels perpendicular with paperbound edge abutting top of spacer strip. Fasten panels with nails 8" o.c. max., or screws 12" o.c. max. Where ceramic tile more than $\frac{5}{16}$ " thick will be used, space nails 4" o.c. max. and screws 8" o.c. max. Adhesive application (see 3.1.1 B above) may be used for attaching panels when ceramic tile no more than $\frac{5}{16}$ " thick will be used.

In areas to be tiled, treat all fastener heads with SHEETROCK 45 or 90 Setting-Type Joint Compound. Fill tapered edges in gypsum panel with this SHEETROCK Setting-Type Compound, embed SHEETROCK Joint Tape firmly and wipe off excess compound. Follow immediately with a second coat over the taping coat, being careful not to crown the joint. Fold and embed tape properly in all interior angles to provide a true angle.

In areas not to be tiled, embed tape and treat fasteners with a SHEETROCK 45 or 90 Setting-Type Joint Compound applied in the conventional manner. Finish with at least two coats of joint compound applied according to directions.

Prior to tile erection, seal cut panel edges of all openings around pipes, fittings and fixtures with thinned tile adhesive. Remove spacer strips, but do not caulk gap at bottom of panels.

Note—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between the tile and shower floor or tub.

3.1.4 Floating Interior Angle System

Apply gypsum panels to ceilings first. Follow standard framing practices for corner fastening. Fit panels snugly at all angles. Apply gypsum panels to walls to maintain firm support for ceiling panels. At horizontal angles, apply the first fastener 8" from the intersection. At vertical interior angles attach the overlapping panel only, at the angle. Use conventional fastening in remainder of area.

3.2 Double-Layer Systems

3.2.1 Base Layer Erection—Direct Attachment

A Ceilings—Apply gypsum panel base layer on ceilings first (perpendicular to framing) (parallel to framing). Position end joints to offset face layer joints by at least 10"; joints may occur on or between framing members. Apply foil-back panels with foil side against framing.

B Sidewalls—Apply gypsum panel base layer with long edges centered on framing members (parallel). When predecorated face layers will be used, apply base layer horizontally. Apply foil-back panels with foil side against framing. Attach panels to framing supports by (screw) (nail) attachment as follows:

C Screw Attachment—Attach panels with power-driven $1\frac{1}{4}$ " Type W screws spaced 24" o.c. max. Stagger screws on adjoining edges and ends.

D Nail Attachment—Attach panels with specified nails spaced 24" o.c. max. Drive nails so heads are flush with surface and opposite each other on adjacent ends and edges.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space fasteners $\frac{3}{8}$ " min. from ends and edges.

3.2.2 Face Layer Erection—Direct Attachment

Use gypsum panels in maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints at least 10" from parallel joints in base layer. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

After panels are cut to size, mix and apply adhesive according to manufacturer's directions and laminate face layer to base layer in the following manner:

Sheet Lamination—For fire-rated construction on walls, apply specified SHEETROCK Setting-Type Joint Compound or SHEETROCK Joint Compound Ready-Mixed to entire back surface of face panels and to extreme edges of panels. Apply adhesive in beads approximately $\frac{3}{8}$ " wide at base and $\frac{1}{2}$ " high and spaced $1\frac{1}{2}$ " to 2" o.c. Laminate face layer to base layer using moderate pressure and temporary support or supplemental fastening as follows:

A Temporary nailing—Use double-headed nails with at least $\frac{3}{4}$ " penetration into framing. Space nails 16" to 24" o.c. When proper bond is developed, remove nails and dimple holes for joint treatment.

B Temporary supports—Brace or shore face layer every 16" to 24". When proper bond is developed, remove supports.

C Screws—Permanently attach face layer with $1\frac{1}{2}$ " Type G screws. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" max. and within 24" of ends.

Strip Lamination—For fire-rated construction on walls, apply specified SHEETROCK Setting-Type Joint Compound or SHEETROCK Setting-Type Joint Compound Ready-Mixed to base layer panels in vertical strips of four $\frac{1}{2}$ " beads, $1\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c. Permanently attach face layer with $1\frac{1}{2}$ " Type G screws placed to penetrate adhesive strips. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of both ends.

For non-rated construction, laminate face to base layer as follows:

Laminating Adhesive—Apply adhesive in strips using notched spreader having $\frac{1}{4}$ "x $\frac{1}{4}$ " min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten as required. For walls, use pre-bowed panels, erect panels vertically and fasten 16" o.c. at top and bottom of panel. For ceilings, space fasteners 16" o.c. along edges and ends, with one permanent fastener per framing member at mid-width of panel.

Liquid Contact Adhesive—Apply adhesive to both contact surfaces according to manufacturer's directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press panel firmly in place and fasten as required. For perpendicular application to walls and for all ceiling applications, fasten face panel at each corner and along edges spaced 48" o.c. max. For parallel application to walls, use pre-bowed panels and fasten 16" o.c. at top and bottom of panel.

Vinyl Foam Tape—Attach gypsum panels, using laminating adhesive and vinyl foam tape applied in continuous strips across back face of panel according to manufacturer's directions.

For mechanical attachment in non-rated construction, space nails 7" o.c. on ceilings, 8" o.c. walls; space screws 12" o.c. on ceilings, 16" o.c. on walls.

3.2.3 Face Layer Erection—Textone Vinyl-Faced Gypsum Panels

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically with joints staggered at least 10" from parallel joints in base layer. Position less-than-full-width panels with cut edge at corner. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

For fire-rated construction, install panels using specified SHEETROCK Setting-Type Joint Compound or SHEETROCK Setting-Type Joint Compound Ready-Mixed as laminating adhesive. Apply adhesive to base layer in vertical strips of four ½" beads, 1½" to 2" o.c. Space strips 24" o.c. Fasten panels 16" o.c. at top and bottom of panel.

For non-rated construction, install face layers, using (laminating) (liquid contact) adhesive as follows:

A Laminating Adhesive—Apply adhesive in strips using notched spreader having ¼"x¼" min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

B Liquid Contact Adhesive—Apply adhesive to both contact surfaces according to manufacturer's directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

Finish joints, edges, corners with TEXTONE Mouldings matching panel finishes and installed according to manufacturer's directions.

3.3 Resilient Attachment Systems

3.3.1 Resilient Channel Erection

Position resilient channels at right angles to wood framing, space (16") (24") o.c. and attach to each support with 1¼" Type W or 1¼" Type S screws driven through holes in channel mounting flange.

On walls, install channels with mounting flange down. (Channel may be inverted at floor to accommodate attachment of base.) Locate channels 2" from floor and within 6" of ceiling. Extend channels into all corners and attach to corner framing. Position channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6". For double-layer system, attach channel through base layer to framing with 1½" Type S screws. Splice channel by nesting directly over framing member, screw-attach through both flanges. Reinforce with ¾" pan head screws located at both ends of splice. Use of a filler strip at the base may reduce STC rating.

Where cabinets are to be installed, attach RC-1 Resilient Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at mid-point between hangers.

Note: Screws attaching cabinets to resilient channels should be placed between studs. Screws that contact studs reduce the system's resiliency and sound rating.

3.3.2 Gypsum Panel Erection—Ceilings

A Base Layer—For fire-rated assembly, apply gypsum base-layer panels with long edges across joists and end joints staggered. Fasten panels to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with 1½" Type S screws spaced 24" o.c. for joists 16" o.c.; spaced 16" o.c. for joists 24" o.c.

B Face Layer—Apply face-layer panels of maximum practical length with long dimension perpendicular to resilient channels and end joints staggered. End joints may occur over resilient channels or midway between channels with joint floated and back-blocked. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" Type S screws spaced 12" o.c. in field of panels and along abutting ends. Cut panels neatly and provide support at cutouts and openings.

3.3.3 USG High Performance Floor/Ceiling System

A Floor—Apply ⅜" bead of SHEETROCK Acoustical Sealant to the center of the top flange of the joists. Place ½" thick min. APA span rated exterior grade plywood sheets with long dimension across wood joists spaced 16" o.c. Fasten plywood to wood joists with (6d)(8d) cc sinkers 6" o.c. along supported ends and 10" o.c. at intermediate joists.

Install SHEETROCK brand Gypsum Liner Panels after the structure is fully enclosed and all interior partitions are installed. Loose lay the liner panels on the subfloor with the long dimension at a right angle to the wood joists. Stagger panel end joints and fit panels closely to wall intersections without forcing. Seal the perimeter of the floor with SHEETROCK Acoustical Sealant to provide an airtight seal.

Finish floor with DUROCK Exterior Cement Board and ceramic tile or oriented strand board and vinyl tile or carpet. See Technical Data Sheet WB-1868 for installation information. (Note: SHEETROCK brand Gypsum Liner Panel floor underlayment is not intended for use in areas subject to prolonged contact with water (e.g. bathrooms, laundry rooms, etc.). For applications in these areas, substitute a double layer of ½" DUROCK Exterior Cement Board for gypsum liner panels to achieve comparable fire- and sound-rated performance.)

B Cavity—Install 3" thick THERMAFIBER SAFB to fit snugly between all floor joists. Support each batt with four spring steel wire rods (0.087" dia. typical) uniformly spaced to hold the batts approximately 1" above the bottom of the joists. Butt ends tightly and fill all voids.

C Ceiling—Apply RC-1 Resilient Channels 16" o.c. perpendicular to joists and fastened with 1½" Type S screws. Attach base layers of ⅝" SHEETROCK brand Gypsum Panels, FIRECODE C Core, perpendicular to channels with 1" Type S screws 16" o.c. at channels, 8" o.c. at panel ends. Attach face layers with 1⅝" Type S screws 8" o.c. at channels, with 1½" Type G screws 8" o.c. at panel ends, staggering screws 4" from screws in base layer. Treat joints and fasteners with SHEETROCK joint system. Seal perimeter with SHEETROCK Acoustical Sealant.

3.3.4 Gypsum Panel Erection—Walls

Apply resilient channel per 3.3.1. Apply gypsum panels of maximum practical length with long dimension parallel to resilient channel and fastened with 1" Type S screws spaced 12" o.c. along channels. Center horizontal abutting edges over screw flange of channel. Where channel resiliency makes screw placement difficult, the next longer screw may be used but do not drive screw directly over stud. For direct attachment, fasten panels to wood studs with 6d nails 8" o.c.

For two-layer application of gypsum panels, apply base layer perpendicular to resilient channels and attach to channels with 1" Type S screws spaced 24" o.c. and to wood studs with 1¼" Type W screws 16" o.c. Apply face layer with long dimension perpendicular to long edges of base layer and fasten with 1⅝" Type S screws 16" o.c.

3.4 Wall Furring Systems

3.4.1 Single-Layer Application—Direct Attachment

Space suitable wood furring strips 16" o.c. and attach to masonry

walls. Apply gypsum panels of maximum practical length with long dimension perpendicular to furring strips. Fasten panels with 1¼" Type W screws spaced 16" o.c. Apply foil-back panels with foil side against furring. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between furring strips and wall.

3.4.2 Mechanical Application—SHEETROCK Z-Furring Channels

Erect insulation vertically on interior of masonry and concrete walls and hold in place with SHEETROCK Z-Furring Channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner. On adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with a standard width insulation panel and continue in regular manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold mineral-fiber insulation in place until gypsum panels are installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment and support of fixtures and furnishings.

Apply gypsum panels parallel to channels with edge joints occurring over channels. Use no end joints in single-layer application. Attach gypsum panels with 1" Type S screws spaced 16" o.c. in field of panels and at edges, and with 1¼" Type S screws spaced 12" o.c. at exterior corners. For double-layer application, apply base layer parallel to channels, face layer either perpendicular or parallel to channels with vertical joints offset at least one channel. Attach base layer with screws 24" o.c. and face layer with 1½" screws 16" o.c.

3.5 Gypsum Sheathing Application

Apply 24" wide sheathing horizontally with tongue edge up. Install supplementary bracing as required by applicable code. Fasten sheathing with nails spaced 8" o.c. along each stud.

Apply 48" wide sheathing vertically with bottom edge bearing on foundation or subfloor. Install supplementary bracing (and adhesive) as required by applicable code. Fasten sheathing to studs and plates with nails 8" o.c.

3.6 Exterior Ceilings and Soffits

Apply SHEETROCK brand Exterior Gypsum Ceiling Board (perpendicular to supports) (parallel to supports) with end joints over supports and with ¼" to ⅛" space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12" o.c. or nails spaced 8" o.c. Where specified, cover joints with wood battens securely fastened to framing. Finish joints, trim and fasteners with a SHEETROCK Setting-Type Joint Compound applied according to directions.

3.7 Accessory Application

A Joint System—Finish all face panel joints and internal angles with a United States Gypsum Company Joint System applied according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

B Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with nails or ⅝" galvanized staples 9" o.c. on both flanges along entire length of bead.

C Metal Trim—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9" o.c.

D P-1 Vinyl Trim—Slip trim over gypsum panel edge with long flange behind panel. Install panel with trim firmly abutting surface.

E Screws—Power-drive at least ⅜" from edges or ends of gypsum panels to provide uniform dimple ⅛" deep.

F Control Joints—Break gypsum panels and resilient channels behind joint and back by double supports. Apply acoustical sealant to fill gap and attach control joint to face layer with nails or ⅝" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

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Indiana: Indianapolis, (317) 848-1513

Louisiana: New Orleans, (504) 241-2020

Maryland: Baltimore, (301) 355-2200

Massachusetts: Charlestown, (617) 241-8530

Michigan: Southfield, (313) 569-1900

Minnesota: Bloomington, (612) 854-4233

Missouri: St. Louis, (314) 349-0980

New York: Albany, (518) 458-7437

Oakfield, (716) 948-5287
Stony Point, (914) 786-2820

North Carolina: Charlotte, (704) 552-7402

Ohio: Chesterland, (216) 729-1956

Oregon: Beaverton, (503) 626-8864

Pennsylvania: Pittsburgh, (412) 341-2434

Tennessee: Nashville, (615) 361-8419

Texas: Dallas, (214) 490-0771

Houston, (713) 666-0751

Utah: Salt Lake City, (801) 266-4975

Virginia: Richmond, (804) 285-7528

International Division: Chicago, (312) 606-5831

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

United States Gypsum Company

101 South Wacker Drive

Chicago, Illinois 60606-4385

A Subsidiary of USG Corporation

USG Area Separation Wall Systems



For party walls and fire walls

USG

Description

USG Area Separation Walls are remarkable developments for constructing common walls with fire-resistive protection for adjacent properties. These lightweight, non-load bearing gypsum drywall assemblies are designed as vertical fire barriers for fire walls and party walls separating occupancies in wood-frame apartments and townhouses. They are the essence of simplicity—large-size gypsum panels used in construction with steel studs and runners quickly become thin, space-saving walls offering remarkable acoustical privacy. Their engineered performance and low labor and material costs make these systems superior to the usual masonry construction.

Available in two basic systems both providing fire-resistant walls from ground level to roof:

Solid Type, with independently framed interior gypsum panel surfaces both sides of fire wall or party wall.

Cavity Type, with integral interior gypsum panel surfaces for commonly shared party walls between apartments.

Solid-Type Wall consists of two 1" thick SHEETROCK brand Gypsum Liner Panels installed vertically between 2" USG Steel C-Runners. Panel edges are inserted in 2" USG Steel H-Studs spaced 24" o.c. C-runners are installed at top and bottom of wall and back-to-back between vertical panels cut to a convenient length above each intermediate floor. Studs are attached to wood framing at intermediate floors with 0.063" USG aluminum angle clips which break away when exposed to fire, thus permitting a fire-damaged structure to fail while the fire barrier remains intact. An additional clip-to-stud attachment is required 5' o.c. below the top 23' of the building.

With 25-ga. steel H-studs, the assemblies are suitable for floor-to-ceiling heights up to 10' under 5-psf lateral load and up to 8' as an exterior wall under 15-psf wind load without exceeding L/240 allowable deflection.

With 2" THERMAFIBER Sound Attenuation Fire Blankets (SAFB) stapled each side of liner panels, the assembly has obtained a 3-hr. fire resistance rating allowing separate selection and construction of tenant walls.

Cavity-Type Wall consists of steel C-H Studs and SHEETROCK brand Gypsum Liner Panels set in steel runners and faced both sides with SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core. Liner panels, 1" thick, are erected vertically with ends set into 2½" USG C-Runners and edges inserted into specially formed 2½" USG Steel C-H Studs. C-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line above each intermediate floor. Aluminum clips, which attach the studs to adjacent wood framing, break away in the same fashion as with solid-type walls. To improve sound transmission loss, THERMAFIBER SAFB are inserted in the stud cavity and RC-1™ Resilient Channels (part of the family of SHEETROCK Metal Products) may be used to isolate the face layer.

With 212CH25 steel studs spaced 24" o.c., the systems are suitable for floor-to-ceiling heights up to 10' under 5-psf lateral load and up to 8' as exterior walls under 15-psf wind load without exceeding L/240 deflection. For buildings over 23' in height, use 400CH20 studs on the lower floors below the top 23' of the building.

Components used in these systems are designed to permit temporary exposure to inclement weather during construction. Construction using the USG Aluminum Breakaway Clip is covered by U.S. Patent No. 3,974,607.



- a. USG Steel H-stud slides in place over SHEETROCK brand Gypsum Liner Panels.
- b. USG Steel C-Runner fits over studs and panels. Second C-runner is then screw-attached back-to-back to lower runner to hold next level of studs and liner panels.
- c. USG Aluminum Breakaway Clip is screw-attached to studs and framing. Under fire exposure, clip breaks away, permits fire-damaged wall to fail, leaving separation wall intact.

Function and Utility

These systems may be used in buildings up to four stories high and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when building offsets are desired; also for use with flat wood decks.

Fire Resistance—Both types of Separation Walls offer 2-hr. and 3-hr. fire ratings.

Sound Isolation—STC ratings up to 60 with the solid system and 57 in the cavity system are available.

Lightweight—These drywall assemblies weigh at least 50% less than masonry walls typically used. This fact speeds installation.

Space-Saving—Use of these assemblies gains valuable floor space. Thickness is 3½" to 4" for Cavity Type Walls, compared to 8" to 12" for a masonry wall without interior finish.

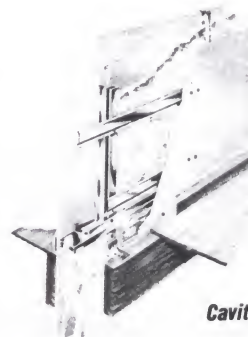
Weather Resistance—Moisture-resistant components permit installation in any weather men can work—eliminate many costly winter construction delays.

Limitations

Non-load bearing; max. frame spacing: 24"; not recommended for shear walls without suitable diagonal bracing; max. building height: 44'.

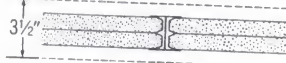
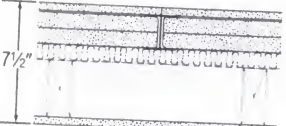
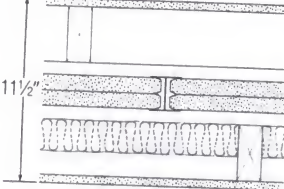
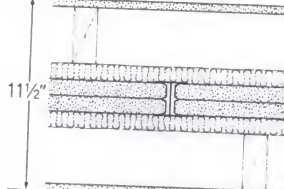
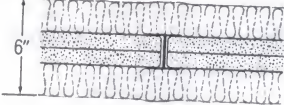


Solid-type



Cavity-type

Test Data

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
2 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—min. 3/4" air space both sides separating liner panels from any adjacent construction— UL Des U336	N A		A
2 hr. est.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—1" THERMAFIBER SAFB stapled over gypsum liner panels—1/2" SHEETROCK brand gypsum panels—perim caulked—est. fire rating based on WHI-495-PSV-0245	47	Based on no SAFB— TL-88-234	B
2 hr.		Solid Area Separation Wall—1/2" SHEETROCK brand gypsum panels—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c. 2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/4" from liner panels—2" THERMAFIBER SAFB in one cavity—gypsum panels att with 1 1/4" Type W screws 12" o.c.—joints stag & fin.—perim caulked— UL Des U336	54 46 58 57 60 45 54 57	TL-88-348 Based on 2x4s and no SAFB— TL-88-353 Based on 2x4s and 2" SAFB on both sides— TL-88-347 Based on 2x4s and 3" SAFB on one side— TL-88-351 Based on 2x4s and 3" SAFB both sides— TL-88-350 Based on 2x3s, 5/8" gypsum panels, no SAFB— BBN-730104 Based on 2x3s, 5/8" gypsum panels, 2" SAFB one side— BBN-730103 Based on 2x3s, 5/8" gypsum panels, 2" SAFB both sides— BBN-730102	C
2 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/4" from liner panels—1" THERMAFIBER SAFB stapled to both sides of liner panels—1/2" SHEETROCK brand gypsum panels facing ea side— WHI-495-PSV-0245	53 50	TL-88-346 Based on 1" SAFB one side— TL-88-344	D
3 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2" THERMAFIBER SAFB both sides—bltks appl horiz with joints stag and staple-att to liner panels— WHI-495-0393 0394	N A		E

 THERMAFIBER Insulation

Description

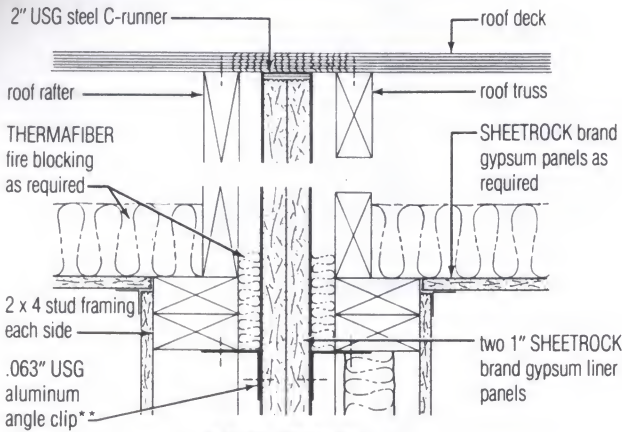
Two-hour fire rated solid area separation walls consist of a fire barrier of two 1" SHEETROCK brand Gypsum Liner Panels inserted between USG Steel H-Studs 24" o.c. set in runners. This barrier wall is finished one or both sides with 1/2" SHEETROCK brand Gypsum Panels, 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or 5/8" SHEETROCK brand Gypsum Panels, FIRECODE Core, applied direct to USG Steel H-Studs or to separate framing. With 2" THERMAFIBER

SAFB stapled to each side of liner panels, the assembly offers 3-hr. fire resistance. Check local code for acceptable system.
Sound isolation up to 57 STC is offered depending on the interior wall construction used. Systems using steel studs or wood studs provide the same sound control. Based on the location in the building the area separation wall can be varied to provide the framing and finish desired. Consult local code for limiting criteria.

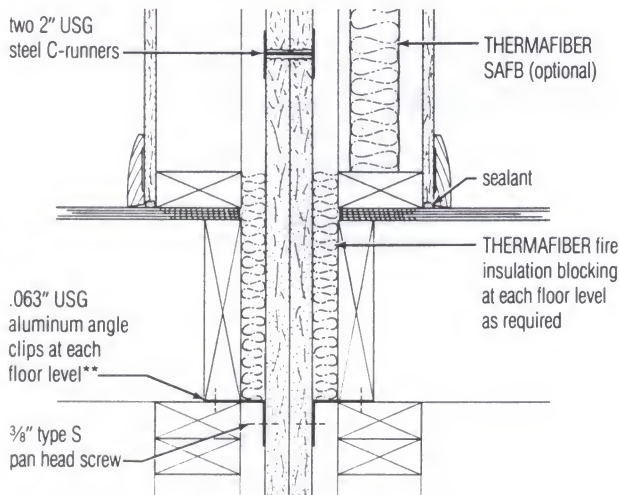
Sound Transmission Loss—db

Test no.	Method	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
TL-88-350	Lab	40	45	50	49	53	53	55	57	62	65	67	69	72	70	68	71	60
TL-88-347	Lab	34	40	48	48	50	52	55	56	61	64	66	69	72	70	69	73	58
BBN-730102	Lab	36	38	46	52	53	56	57	56	59	59	59	60	59	57	58	66	57
TL-88-351	Lab	36	36	45	47	51	52	54	56	61	64	66	69	72	71	69	73	57
USG-840325	Lab	33	35	43	49	55	56	58	61	64	66	68	71	74	72	71	74	56
TL-88-233	Lab	37	39	45	47	52	53	53	56	59	58	56	56	57	59	59	59	56
BBN-73103	Lab	34	33	43	51	52	54	57	56	60	60	58	60	60	57	58	66	54
TL-88-348	Lab	31	33	42	45	48	49	52	54	59	63	65	68	70	68	67	71	54
TL-88-346	Lab	29	32	44	45	49	49	50	51	57	62	65	68	71	69	67	69	53
TL-88-234	Lab	31	28	31	34	38	42	44	49	55	61	64	66	70	70	69	71	50
TL-88-353	Lab	26	25	29	35	39	45	47	52	58	61	65	69	71	67	67	70	46
BBN-73104	Lab	28	24	28	37	40	46	50	53	58	60	59	60	58	57	59	66	45

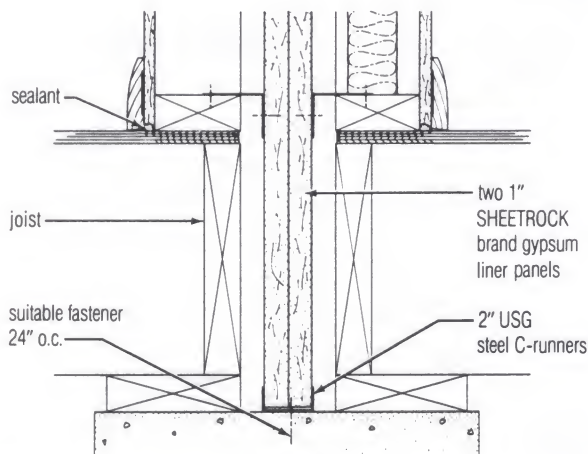
Note: As required by code, 5/8" SHEETROCK brand gypsum panels, FIRECODE core, may be used as underlayment to the untreated roof sheathing with panels extending 4' on both sides of area separation wall.



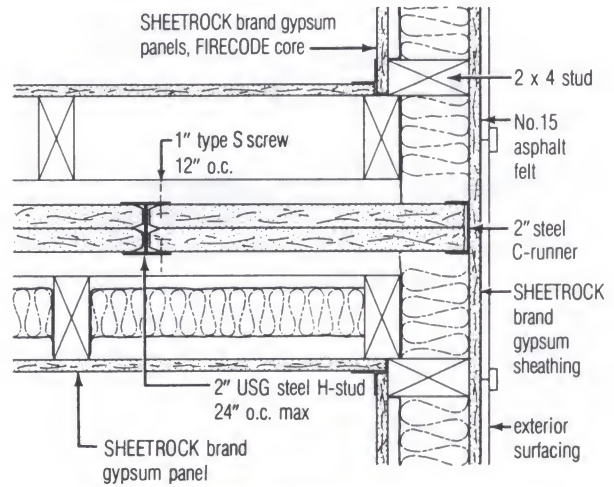
Intersection at roof
alternate to parapet



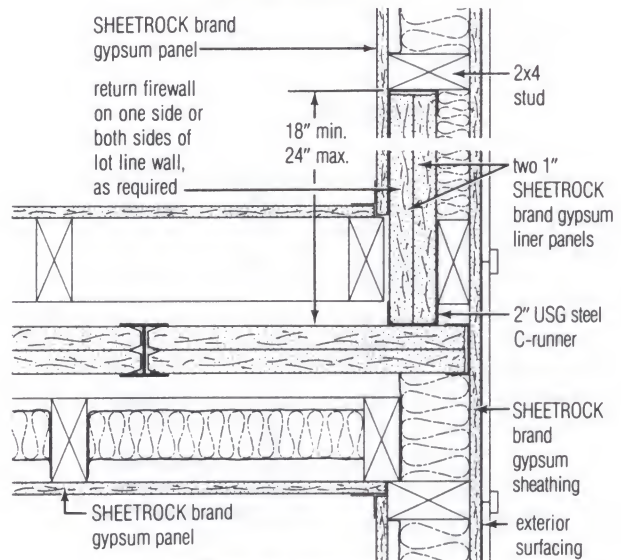
Intermediate floor



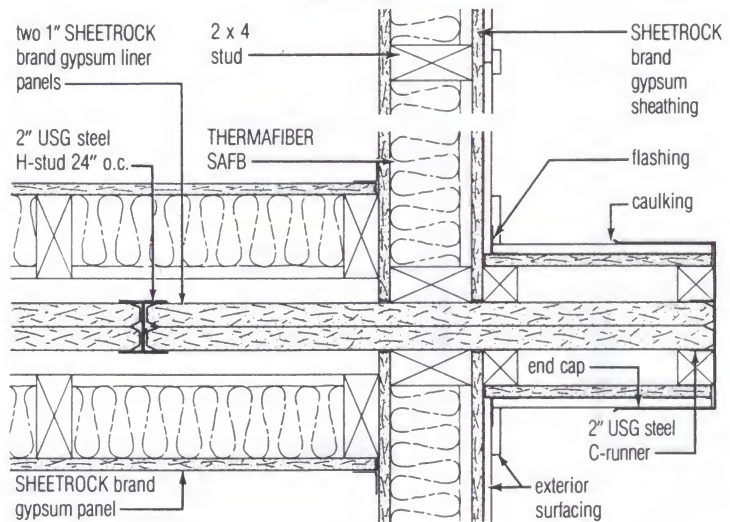
Foundation



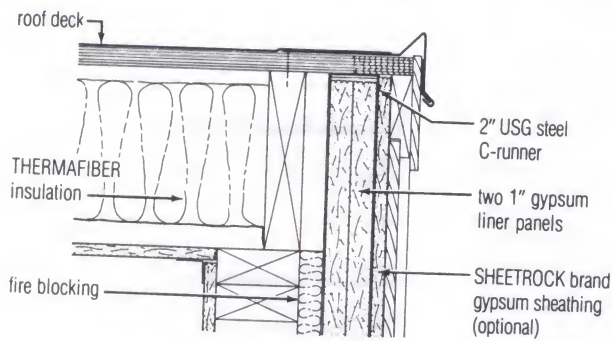
Exterior wall intersection



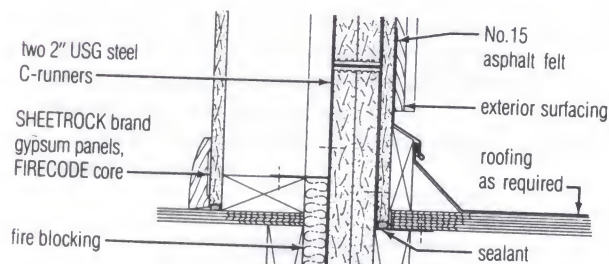
Exterior wall intersection



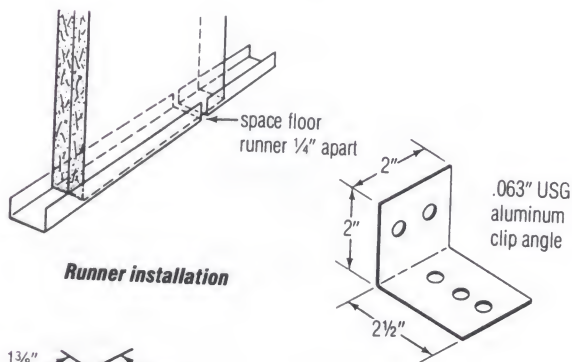
Wing wall



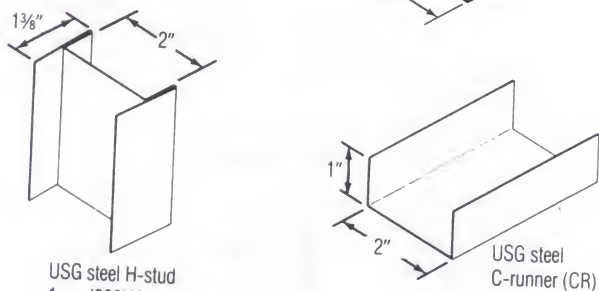
Roof at rake end



Intermediate floor pitched or flat roof



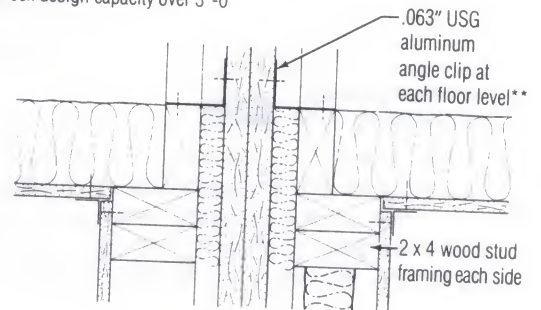
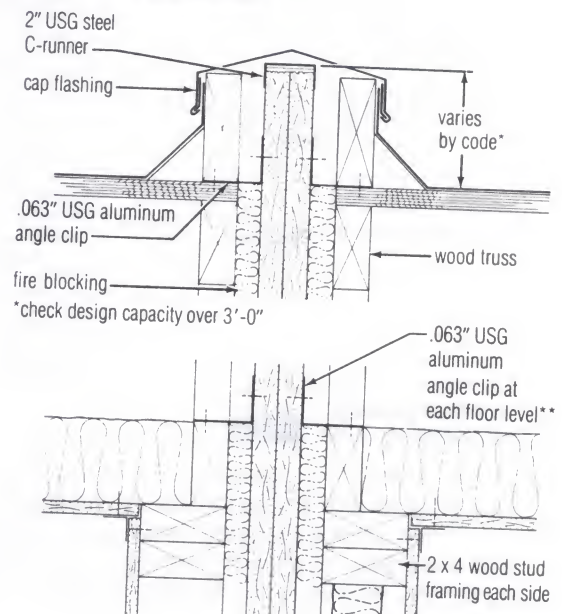
Runner installation



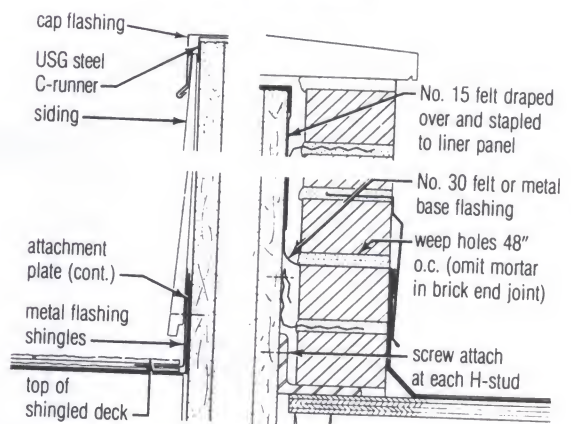
Steel components (solid wall)

****Note:** additional clip angles are needed midheight between floors (5' o.c. max.) for area below top 23' of building up to 44'.

Optional roof intersections

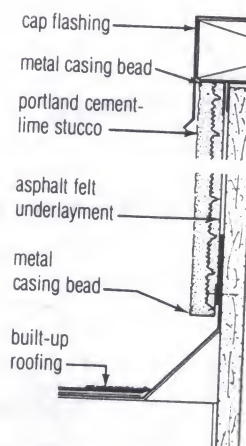


Roof parapet

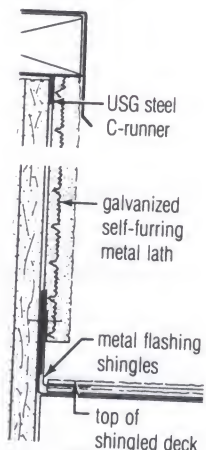


Wood siding

Masonry veneer



Stucco



Stucco

Test Data

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
2 hr.		Cavity Area Separation Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked— U of C 6-23-75 wt 9 width $3\frac{1}{2}$ "	47	Based on $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, and 1" SAFB in cavity— BBN-750704	A
2 hr. est		Cavity Area Separation Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels— $\frac{1}{2}$ " THERMAFIBER SAFB—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked—est. fire rating based on U of C 6-23-75	50	Based on $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— BBN-750411	B
3 hr. est		Cavity Area Separation Wall— $\frac{5}{8}$ " SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels— $1\frac{1}{2}$ " THERMAFIBER SAFB—single layer panels one side appl vert & screw att—2 layers opp side screw att to chan—base layer appl horiz—face layer appl vert—joints fin—perim caulked—est. fire rating based on U of C 2-16-72	57	BBN-730622	C

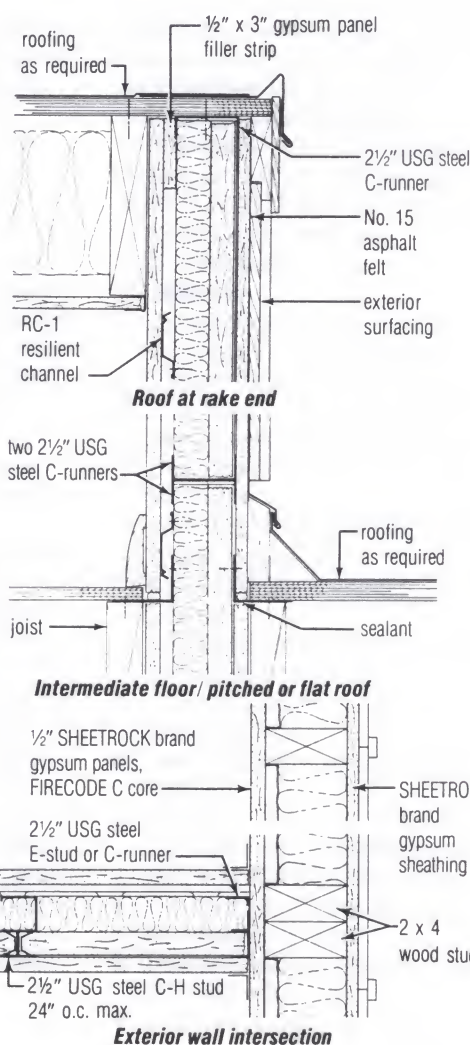
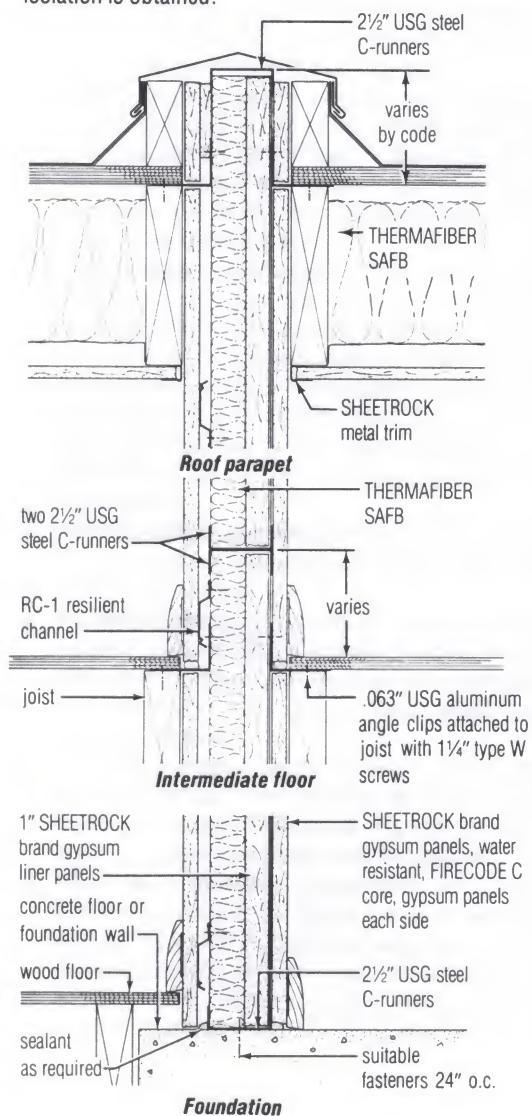
Description

Cavity area separation walls are used as a commonly shared party wall and fire barrier with non-load bearing framing. They consist of USG Steel C-H Studs and 1" SHEETROCK brand Gypsum Liner Panels set in USG Steel C-Runners and faced both sides with ½" SHEETROCK brand Gypsum Panels. FIRECODE C Core.

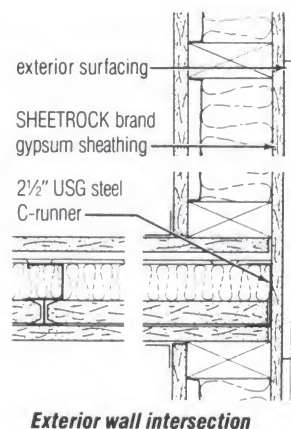
With 1" THERMAFIBER SAFB in the stud cavity, 47 STC sound isolation is obtained.

Sound control of 50 STC is achieved with 1½" SAFB inserted in the stud cavity and RC-1 Resilient Channels screw-attached to studs to isolate the face layer. A 3-hr. fire-rated assembly, with 1½" SAFB in the stud cavity, resilient channels and double-layer panels crew-attached to the channels, offers 57 STC sound control (see details).

scale: $1\frac{1}{2}'' = 1'-0''$



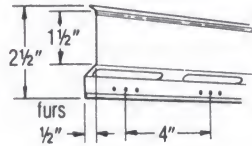
Note: Use 400CH20 studs for area *below* top 23' of buildings up to 44'.



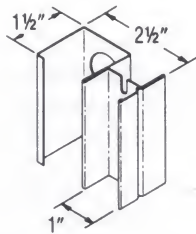
Sound Transmission Loss—db

Test no.	Method	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
BBN-730622	Lab	35	38	44	50	51	55	56	55	61	63	62	65	65	60	57	64	57
BBN-750411	Lab	26	32	42	44	48	51	53	54	58	60	59	61	61	57	56	60	50
BBN-750704	Lab	23	26	35	39	43	48	49	51	54	58	58	60	60	55	51	53	47

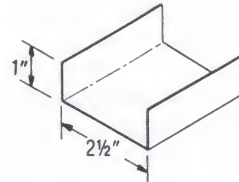
Steel components (cavity wall)



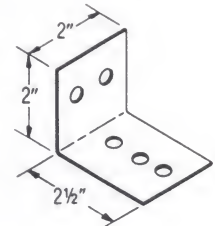
RC-1™ Resilient Channel



USG Steel C-H Stud (CH)



USG Steel C-Runner (CR)



.063" USG Aluminum Angle Clip

Good Design Practices

- System Performance**—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products manufactured and assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
- Control Joints**—Gypsum panel surfaces should be isolated with control joints or other stress relief where: (a) partition abuts a structural element (except floor) or dissimilar wall or ceiling; (b) construction changes within the plane of the partition; (c) partition run exceeds 30'; (d) expansion or control joints occur in the base exterior wall.
- Sound Control Construction**—Where these constructions are used for sound control, seal the partition perimeter with 1/4" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Flanking paths and back-to-back penetrations of the diaphragm should be eliminated. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction. Door and borrowed-light openings are not recommended.
- Wood Framing Requirements**—Wood framing meeting the minimum requirements of local building codes is necessary for proper performance.
- Fixture Attachment**—Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.
- Cavity Type Walls**—SHEETROCK brand Gypsum Panels, FIRECODE C Core, may be used when partitions will not be exposed to moisture or inclement weather during construction. If weather exposure is expected, panels must be protected.
- Additional Information**—See technical folders in this series: Construction Selector SA-100 for fire and sound-rated systems; Gypsum Panels and Accessories Folder SA-927 for information on systems components; Texture and Finish Products Folder SA-933 for finishing product specifications; THERMAFIBER Life-Safety Insulation Systems Folder SA-707 for insulation specifications.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Installed panels should be protected from the environment and dry before enclosing the wall.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperature within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- Gypsum Board—48" wide, (1/2") (5/8") thick (Regular) (Foil-Back) SHEETROCK brand (Water-Resistant) (FIRECODE C) (FIRECODE) Gypsum Panels—lengths as required.
- Liner Board—24" wide, 1" SHEETROCK brand Gypsum Liner Panels, beveled edge, lengths as required.
- USG Steel C-H Studs 212CH25, hot-dipped galvanized, lengths as required.
- USG Steel H-Studs one piece (200HS25), hot-dipped galvanized, lengths as required.
- USG Steel E-Studs 212ES25, hot-dipped galvanized, lengths as required.
- USG Steel Runners (200CR25) (212CR25), hot-dipped galvanized, x 10' length.
- USG Aluminum Angle Clip—2" x 2 1/2" x 0.063" Aluminum Breakaway Clips.
- Joint Treatment—(select a United States Gypsum Company Joint System).
- Fasteners—Screws (1 1/4" Type W) (1", 1 1/4", 1 5/8" Type S) (3/8" Type S, pan head) (Galvanized staples, 3/16" crown, 1 1/2" leg).
- SHEETROCK Trim No. (200-A) (401) (402) (801-A) (801-B).
- SHEETROCK Zinc Control Joint No. 093.
- RC-1 Resilient Channel.
- THERMAFIBER Sound Attenuation Fire Blankets (1") (1 1/2") (2") (3") x 16" or 24" x 48".
- SHEETROCK Acoustical Sealant.

Part 3: Execution**3.1 Solid Wall**

- A Foundation**—Position 2" wide steel C-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Space adjacent runner sections ¼" apart. When specified, caulk runner at foundation with ¼" bead of acoustical sealant.
- B First Floor**—Install H-studs and liner panels at a convenient length more than floor-to-floor height. Install two thicknesses of 1" liner panels vertically in C-runner with long edges in H-stud. As an option, H-stud and C-runner may be screw-attached at the end that is fully engaged to runner. Erect H-studs and double-thickness liner panels alternately until wall is completed. Cap top of panels with horizontal C-runner. Fasten all corner C-runner flanges both sides with ¾" Type S screws.
- C Intermediate Floors**—Install back-to-back C-runners and screw-attach together with double ¾" Type S screws at ends and spaced 24" o.c. Secure studs to framing with 0.063" aluminum angle clips screw-attached to both sides of each stud and framing. Install additional row of aluminum clips when horizontal runner joint is within 3' of center wall height. Except at foundation, install fire blocking between joists and fire barrier.
- D Roof**—Continue erecting studs and panels for succeeding stories as previously described. Cut liner panels and H-studs to pitch and length as necessary to follow roof pitch. At roof, cap panels with C-runner and fasten to framing with aluminum clips.
- E Sound Attenuation Fire Blankets**—When specified, install blankets with joints staggered. For direct attachment to 1" liner panels, attach blankets with seven ¼" staples randomly driven through each blanket. Blanket installation within cavities is friction fit between stud framing.
- F Interior Finish**—Apply specified gypsum panels to wood studs and joists with screws or nails in conventional manner.

3.2 Cavity Wall

- A Foundation**—Position 2½" wide steel C-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Caulk runner at foundation with ¼" bead of SHEETROCK Acoustical Sealant.
- B First Floor**—Install 1" liner panels and steel studs cut to a convenient length more than floor-to-floor height. Erect liner panels vertically in C-runner with long edges in groove of C-H stud. Install C-H studs between panels and cap ends of run with E-stud or C-runner. Fasten studs to bottom C-runner on alternate sides with ¾" Type S screws.
- C Intermediate Floors**—Cap top of panels and studs with C-runner and fasten studs to C-runner flanges on alternate sides with ¾" Type S screws. Install bottom C-runner for next row of panels over top runner with end joints staggered at least 12". Fasten runners together with double ¾" screws at ends and spaced 24" o.c. Secure each stud to framing with 0.063" aluminum angle clip, fastened to both sides of each stud with ¾" screws and to framing or subfloor with 1¼" Type W screws.
- D Roof**—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with C-runner and fasten studs to flanges with ¾" screws. Fasten studs to framing with aluminum clips.
- E Sound Attenuation Fire Blankets**—When specified, install blankets between studs and attach to liner panel with five ¼" staples driven through each blanket, one in center and others spaced 3" from each corner. Butt blankets closely and fill all voids.
- F Resilient Channels**—When specified, install RC-1™ Resilient Channels horizontally to face side of studs, 6" above floor, 6" below ceiling joists and max. 24" o.c. Attach channels to studs

with ¾" Type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs or C-runners. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

- G Gypsum Panels**—Apply ½" SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core, vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" Type S screws spaced 12" o.c. in field and along edges and runner flanges.
- H Resilient Single-layer**—Apply ½" gypsum panels vertically to resilient channels and fasten with 1¼" Type S screws placed 6" away from stud and 12" o.c. Do not place screws directly over stud.
- I Resilient Double-layer**—Apply ⅝" gypsum panel base layer perpendicular to resilient channels with joints staggered; fasten with 1¼" Type S screws placed 6" away from stud and 12" o.c. Apply ⅝" gypsum panel face layer vertically over base layer with edge joints staggered and attach with 1⅝" Type S screws spaced 12" o.c. and staggered from those in base layer.

3.3 Accessory Application

- A Joint System**—Finish all face panel joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.
- B Metal Trim**—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9" o.c.
- C Screws**—Power-drive at least ⅜" from edges or ends of gypsum panels to provide uniform dimple ⅛" deep.
- D Control Joints**—Break gypsum panels and resilient channels behind joint and back by double supports. Attach control joint to face layer with nails or ⅝" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, SHEETROCK, FIRECODE, THERMAFIBER, RC-1.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

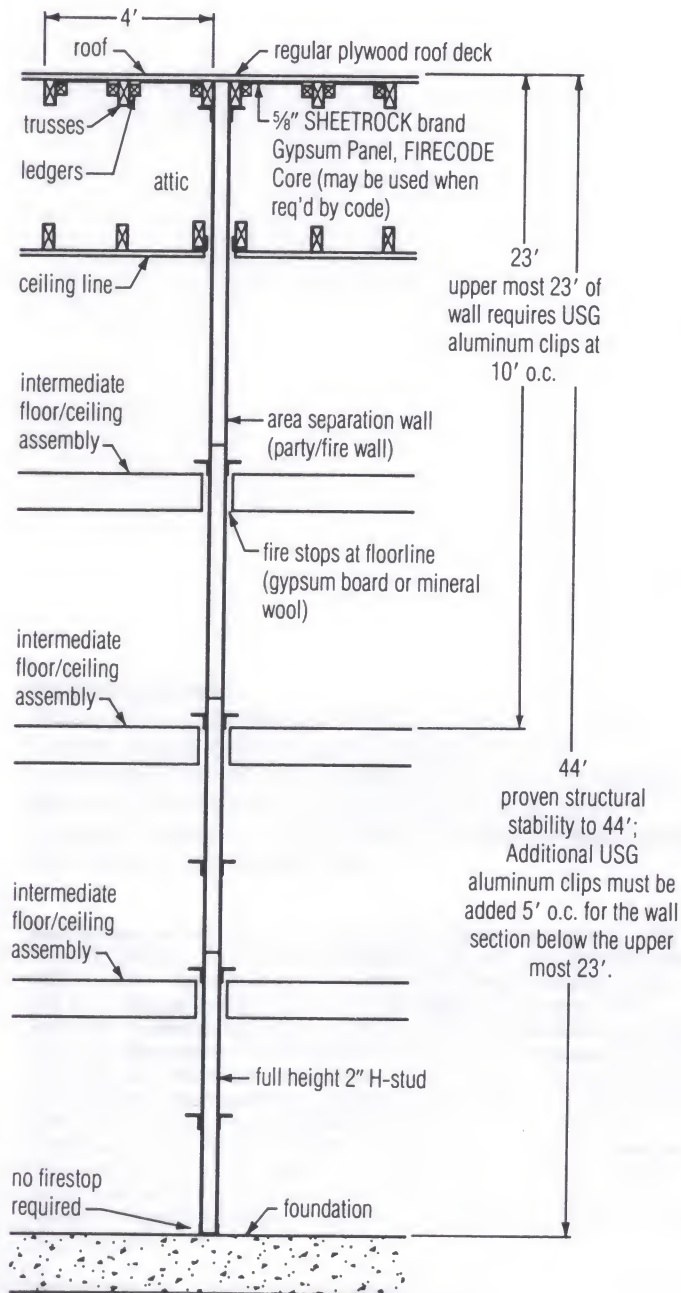
Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

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United States Gypsum Company

101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

New Fire Tests Substantiate Structural Stability of the USG® Area Separation Wall System



USG Area Separation Wall System

With New UL Design U336 Fire Test Data

System shown terminated at roof;
parapet detail also available.

Providing life-safety is the critical function of USG Area Separation Walls. Because of this United States Gypsum Co. recently completed a test program at Underwriters Laboratories, Inc., to establish the structural stability of the 2-hour area separation wall, UL Design U336, when installed to a stacked height of 44' or four stories plus attic.

The area separation wall is designed for use as a "fire wall," "party wall," or "townhouse separation wall" as prescribed by the language of various code agencies. These walls are stacked continuously from the foundation to the underside of the roof, or penetrate the roof as a parapet. The exclusive United States Gypsum Co. tests now substantiate the structural stability of that stacked configuration for two, three and four story construction as listed in UL Design U336. In fact, the USG Area Separation Wall design is the *only* verifiable fire-resistive construction so tested. This simply adds credibility to the already field-proven USG system.

Stability of the wall in fire is achieved by way of the special USG™ Aluminum Breakaway Clips connected to the structure at each USG™ H-Stud on both sides of the wall. The clips perform as a breakaway fuse on the fire side of the wall by melting from or yielding to the rise in temperature allowing the fire-engulfed structure to collapse independent of the separation wall. The aluminum clips on the opposing side of the wall are unaffected by the fire as demonstrated in the tests and thus restrain the separation wall in place as intended.

The key features of the new U.L. design are as follows:

Clip Requirements

The tests reveal that the USG Aluminum Breakaway Clip is required at intermediate floors and roof with spacing not to exceed 10' o.c. for buildings up to two stories or 23' max. Three and four story buildings will require an additional clip at 5' o.c. on the floors below the uppermost 23' of the building.

Stud Height

The tests eliminated the need to cut H-studs 3/4" short of the full runner engagement. The studs may now extend for the full length of the SHEETROCK® brand Gypsum Liner Panels.

Fire Stop

The need for THERMAFIBER® Insulation fire stop at the foundation or lower floor on grade is no longer required in UL Design U336.

Roof Design

Both BOCA and SBCCI code bodies permit the use of 5/8" SHEETROCK brand Gypsum Panels, FIRECODE Core, as an underlayment to the untreated roof sheathing. When required by code, this underlayment extends 4' on both sides of the USG Area Separation Wall and may be used as a design option in lieu of a parapet.

USG

For More Information

Refer to the Area Separation Wall Technical Feature in Form & Function, Issue 3, 1990, for more on the advantages and performance of the USG Area Separation Wall System. For system information, performance data, specifications and technical drawings in addition to those shown here, see system folder SA-925 USG Area Separation Wall Systems.

Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (415) 792-4400; Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293; Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0700 • **Hawaii:** Honolulu, (808) 538-7712 • **Illinois:** Chicago, (312) 606-4130 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (301) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437; Oakfield, (716) 948-5287; Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Chesterland, (216) 729-1956 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Pittsburgh, (412) 341-2434 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771; Houston, (713) 666-0751 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5831.

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United States Gypsum Company

101 South Wacker Drive
Chicago, Illinois 60606-4385
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USG Cavity Shaft Wall Systems

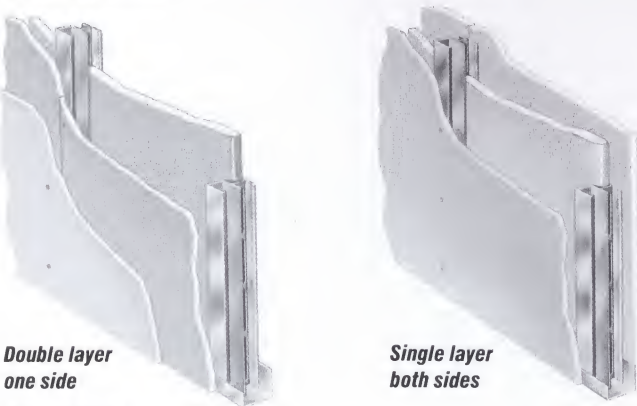


For shaft enclosures in multi-story buildings

USG

Fire-Resistant Drywall Partitions for Enclosing Shafts in Multi-Story Buildings

2-hour assemblies



**Double layer
one side**

**Single layer
both sides**

Description

USG Cavity Shaft Walls offer high performance characteristics and greater economy than other shaft walls. Engineered design of the C-H stud system provides a thinner, lighter weight assembly that offers faster installation and lower material costs, producing lower in-place costs as well as savings in structural steel. In addition, USG Shaft Walls provide up to 4-hour fire resistance and sound ratings to 51 STC. They resist intermittent lateral loads up to 15 psf; also resist fatigue failure under cyclic lateral loading.

USG Cavity Shaft Walls are non-load bearing gypsum board partition assemblies designed for erection from outside the shaft at each floor. Shafts are enclosed early in construction, the walls finished later along with interior partitions. This fast-installation feature combined with low-cost materials and high performance values makes USG Cavity Shaft Walls superior enclosures for elevator and mechanical shafts, air ducts and stairwells in multi-story buildings.

USG Cavity Shaft Walls are covered by three model building codes under NER 258. In addition to a 1½" deep x 22½" wide vertical chaseway, the C-H Stud used has 1" dia. holes 16" from each end for horizontal conduit runs. A 3" deep chase to carry electrical elevator controls is available with the 4" C-H Stud.

The assemblies are simply constructed of SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base and veneer finish, steel studs and runners, and SHEETROCK brand Gypsum Liner Panels.

SHEETROCK brand Gypsum Liner Panels are installed vertically between USG Steel J-Runners attached to floor and ceiling. Panel edges are inserted into specially formed USG Steel C-H Studs spaced 24" o.c. The 2-hour shaft wall is completed with double-layer ½" thick gypsum panels and a United States Gypsum Company joint system, or with gypsum base and veneer finish applied to one side. Where both sides of the wall must be finished, single-layer panels are applied each side of studs. A 1-hour assembly is obtained with

single-layer ⅝" thick face panels. Additional layers of panels are installed in 3 and 4-hour fire-rated construction (see details, page 3).

Liner panels have a special fire-resistant core and multi-layered green paper facings that are treated to resist moisture penetration. The panels are 1" thick, 24" wide and have beveled edges. SHEETROCK brand Gypsum Panels, FIRECODE C Core, for these systems are ½" or ⅝" thick and 4' wide. IMPERIAL FIRECODE C Gypsum Base, ½" or ⅝" thick and 4' wide, has a high-strength, high-density core covered with special-absorption face paper for a veneer finish. USG Steel J-Runners, C-H Studs and E-Studs are formed from hot-dipped galvanized steel.

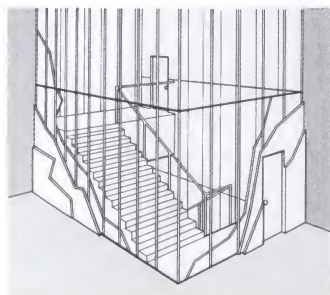
Engineered Performance to Meet Design and Fire Protection Requirements

Walls that enclose elevator shafts, stairwells and other vertical shafts are the most important walls in a building from a life-safety standpoint. Should a fire occur, firemen control the use of elevators; the stairwells provide the only means for human egress within the building. Since these walls contain the life-lines of the building, they must be structurally strong to withstand lateral loads and provide needed fire protection.

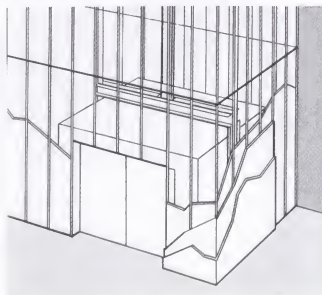
USG Cavity Shaft Wall Systems have been designed and tested using accepted engineering practices with deflection criteria of L/120, L/240, and L/360 clear partition heights. Additionally, limiting height tables listed herein account for flexural and shear forces. A wide range of product and installation combinations is available to meet performance requirements: intermittent air pressure loading of 5, 7½, 10, 15 psf; vertical heights in three stud sizes and four steel thicknesses to accommodate lobbies and mechanical rooms (see Limiting Height Table, page 5). A 2-hr. fire-resistant rating, a common building code requirement, is met with USG Cavity Shaft Walls—UL Design No. U438 and U467. A 2-hr. fire-resistant assembly using DUROCK Interior Cement Board on the finish side is also available—UL Design U459. Up to 4-hour fire-resistance ratings and excellent sound control are offered with modified assemblies (see test data, page 3). Surface burning characteristics for 1" SHEETROCK brand Gypsum Liner Panels are flame spread 20, smoke developed 0. Many assembly details for doors and other penetrations of USG Shaft Walls have been tested for compliance with 2-hr. fire ratings (see pages 6 to 8).

Faster Completion—Earlier Occupancy

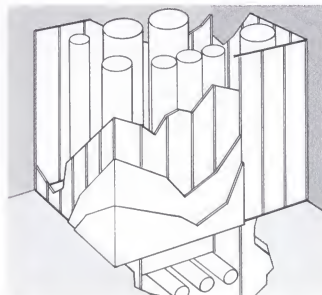
USG Cavity Shaft Walls erect easily using components and application procedures familiar to mechanics. Cavity Shaft Walls, because they are erected without adhesives, install faster than other multi-layer gypsum panel systems. All USG Cavity Shaft Wall Systems install from each floor, leaving shaft free of scaffolding. Elevators go in months earlier than with masonry enclosures—ready to move men and materials to floors when they are needed. Jobs move faster, schedules are more easily met and buildings can be occupied sooner.



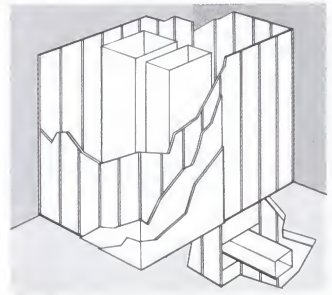
Stairwells



Elevator shafts



Mechanical shafts



Air ducts

Economy

USG Cavity Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 9 psf for 2-hour systems to 16 psf for the 4-hour assembly. In high-rise buildings, where masonry shaft enclosures can weigh up to 45 psf, USG Cavity Shaft Walls offer an opportunity for significant savings in structural framing costs.

Sound Control

The standard Cavity Shaft Wall assembly offers 39 STC rating; 47 STC can be obtained by adding 1" THERMAFIBER Sound Attenuation Fire Blankets (SAFB) within the partition cavity and 51 STC with RC-1™ Resilient Channels (part of the family of SHEETROCK Metal Products) and 1½" THERMAFIBER SAFB.

Provide Airtight Seal

With SHEETROCK Acoustical Sealant applied to partition perimeter and penetrations, the assemblies resist air pressure surges up to 15 psf (see details). This minimizes whistling and dirt accumulation due to air movement in elevator shafts.

Strong, Rigid Studs

Engineering design has developed the unique C-H Stud, a strong, rigid and highly efficient structural member. The stud flanges provide friction-fit contact along the entire liner panel length to eliminate rattles. When used with J-Runners and gypsum liner panels, the C-H Stud produces a stronger, sturdier wall permitting greater limiting heights compared to competitive systems.

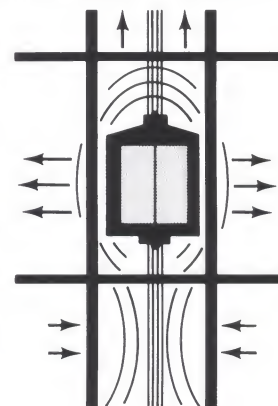
Impact-Resistant

USG Cavity Shaft Walls subjected to impact proved to be rugged and durable. Wall was impacted with a 60-lb. sand bag. In the test, three impacts each were made at 15 ft.-lb., 30 ft.-lb., and each following 15 ft.-lb. interval until failure. At 270 ft.-lb. the test was stopped;

while cracked, the wall was not penetrated, thus showing remarkable toughness.

Flexing Resistance Provides Life-Safety

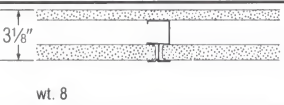
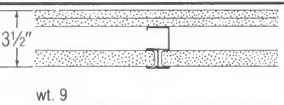
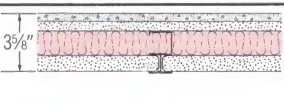
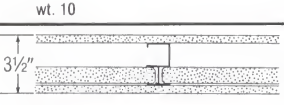
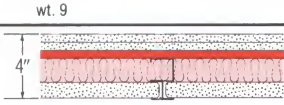
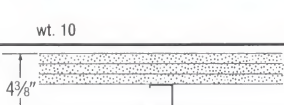
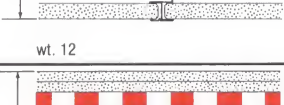
Shaft walls are "working walls." They are subjected to both positive and negative pressures as elevator cabs rise and descend. This piston-effect of elevators in a shaft causes continual flexing in the shaft wall. In tests, USG Cavity Shaft Walls were subjected to over one million full oscillation cycles to check wall performance through the life of the building. These tests showed a 25-ga. J-Runner is inadequate at the top or bottom of a shaft wall. As the long runner leg is continually flexed from wall deflection, it can rupture and screws strip out and fracture from the flexing. Oscillation tests showed 24-ga. runners minimize these problems and are *essential to safety* over a long time period.



Limitations

- 1 Non-load bearing.
- 2 Stud and runner thickness, stud spacing, air pressure loading and maximum flexural stress shown in the Technical Data tables should not be exceeded.
- 3 Elevator door operating equipment must be independently mounted.
- 4 Exposure to excessive or continuous moisture and temperatures exceeding 125°F (52°C) must be avoided.

Test Data

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.	 wt. 8	Cavity Shaft Wall Gypsum Drywall—5/8" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o. c.—panels appl to side opp liner panels & screw att—joints fin—fire rating also applies with IMPERIAL FIRECODE C base and veneer finish surface—UL Des U469	N/A		A
2 hr.	 wt. 9	Cavity Shaft Wall Gypsum Drywall—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel 25-ga. C-H studs 24" o. c.—panels appl vert to side opp liner panels & screw att—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface—fire-tested both sides—UL Des U438	39 47	USG-750302 Based on 1" THERMAFIBER SAFB—BBN-750706	B
2 hr.	 wt. 10	Cavity Shaft Wall Cement Board/Gypsum Drywall—1/2" DUROCK interior cement board—5/8" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20 ga. min C-H studs 24" o. c.—1 1/2" THERMAFIBER SAFB—cement board screw att with 1 3/8" DUROCK steel screws & laminated to gypsum panel with 4" strip DURABOND ceramic tile mastic applied with 3/4" notched trowel midway betw studs—joints fin—UL Des U459*	N/A	N/A	C
2 hr.	 wt. 9	Cavity Shaft Wall Gypsum Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o. c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface—fire-tested both sides—UL Des U467	N/A		D
2 hr. est	 wt. 10	Cavity Shaft Wall Gypsum Drywall—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o. c.—RC-1 chan spaced 24" o. c.—1 1/2" THERMAFIBER SAFB—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin—est. fire rating based on U of C-2-8-72 and U of C-6-23-75—rating also applies with IMPERIAL FIRECODE C base and veneer finish	51	BBN-750412	E
3 hr. est	 wt. 12	Cavity Shaft Wall Gypsum Drywall—3 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o. c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer apply horiz—joints fin—est. fire rating based on U of C-2-16-72—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		F
4 hr. est	 wt. 16	Cavity Shaft Wall Gypsum Drywall—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, face side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o. c.—1" liner panels & 5/8" gypsum panel core screw att to studs—horiz met fur chan 24" o. c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin—est. fire rating based on U of C-5-24-74—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		G

*Use L/360 deflection criteria for limiting height/stud selection. Refer to SA-932 DUROCK Interior Cement Board Systems for more information on cement board and related products.



THERMAFIBER Insulation



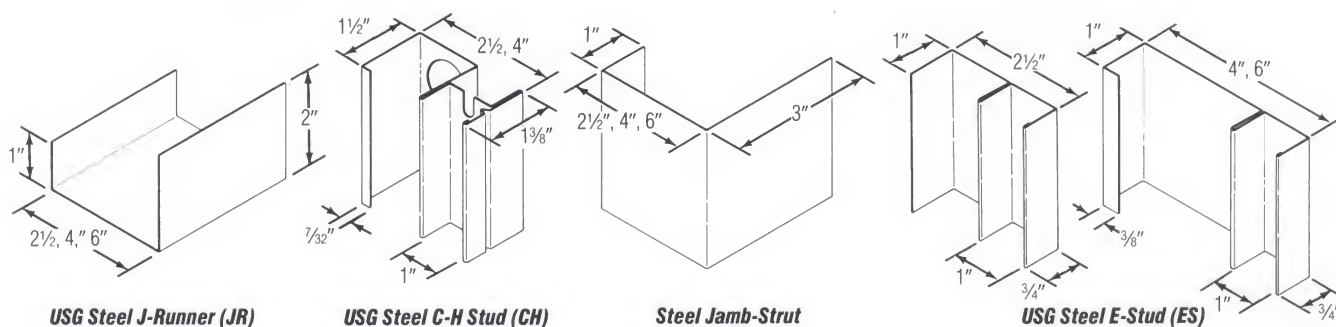
Furring channels



RC-1™ Resilient Channels

Sound Transmission Loss—db

System reference (p.3)	Test no.	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
E	BBN-750412	27	30	38	42	47	50	53	54	55	57	57	58	59	56	55	58	51
B	BBN-750706	24	26	36	40	44	46	48	50	52	53	54	54	55	54	50	52	47
B	USG-750302	20	22	25	33	32	35	36	39	41	43	43	45	41	40	43	46	39



Elevator Shaft Pressures

The air pressure load on shaft walls depends upon the elevator cab speed and the number of elevators per shaft. The following recommendations are derived from United States Gypsum Company tests conducted in three high-rise buildings ranging in height from 17 to 100 stories.

Design Elevator Pressure Load

Elevator velocity ft./min.	One or two elevators per shaft	Three or more elevators per shaft
0 to 180	5.0 psf	5.0 psf
180 to 1,000	7.5 psf	5.0 psf
1,000 to 1,800	10.0 psf	7.5 psf
1,800 to 3,000	15.0 psf	7.5 psf

Limiting Heights

Maximum partition heights are shown for four different intermittent air pressure loads and three allowable deflections. The applied pressure load is selected by the designer based on elevator cab speed and the number of elevators per shaft. Instead of using only deflection criteria, United States Gypsum Company design data considers several additional factors in determining limiting partition heights.

- Bending stress**—the unit force exerted which will break or distort the stud.
- End reaction shear**—determined by the amount of force applied to the stud which will bend or shear the J-Runner, or, cripple the stud.
- Deflection**—the actual deflection under a load. Allowable deflection is based on the amount of bending under load that a particular wall can experience and still perform its function with safety.

Thickness—Steel Components⁽¹⁾

Style	Design ⁽²⁾		Minimum	
	in	mm	in	mm
CH, ES 25	0.0209	0.53	0.0199	0.51
JR 24	0.0239	0.61	0.0227	0.58
CH 22	0.0310	0.79	0.0294	0.75
ES, JR, JS 20, CH 20	0.0359	0.91	0.0341	0.87

(1) Uncoated steel thickness; meets ASTM A568. Studs and runners meet ASTM C645. Base metal meets ASTM A446 standards for structural performance. Coatings are galvanized per ASTM A525; aluminized per ASTM A463, or aluminum-zinc per ASTM A792. (2) Conforms to AISI Specification for the Design of Cold-Formed Steel Structural Members, 1986 edition.

Structural Properties—Steel Components

Component & size	Stud designation	Avg. weight (lb/lin ft)	Area (in ²)	I _x (in ⁴)	S _x [*] (in ³)	Allow. design stress (ksi)
2 1/2" C-H stud	212CH25	0.604	—	0.146	0.1350	24.0
	212CH22	0.861	—	0.208	0.1519	24.0
	212CH20	0.998	—	0.239	0.1741	24.0
4" C-H stud	400CH25	0.716	—	0.433	0.187	24.0
	400CH20	1.243	—	0.730	0.318	24.0
double 6" E-Stud	600ES25	1.546	0.3982	2.004	0.628	20.00
	600ES20	2.372	0.0840	3.400	1.094	20.00
2 1/2" J-Runner	212JR24	0.448	—	0.117	0.085	3.00
	212JR20	0.670	—	0.192	0.130	4.96
4" J-Runner	400JR24	0.573	—	0.351	0.163	3.00
	400JR20	0.857	—	0.574	0.251	4.96
6" J-Runner	600JR24	0.740	—	0.937	0.295	3.00
	600JR20	1.107	—	1.523	0.457	4.96
2 1/2" Jamb Strut	212JS20	0.818	—	0.226	0.143	3.00
4" Jamb Strut	400JS20	1.006	—	0.647	0.270	3.00
6" Jamb Strut	600JS20	1.256	—	1.673	0.485	3.00

*Full section modulus to be used with corresponding design stress. For wind loads, design stress shown can be increased 33%.

Section Properties—UNIMAST Metal Furring Channel

Item	Gauge	Depth	Steel thick. in.*	I _x in ⁴	S _x in ³	F _c ksi
DWC-25	25	7/8"	.0188	.0096	.0247	13.9
DWC-20	20	7/8"	.0344	.0165	.0355	18.8

*Base steel design thickness.

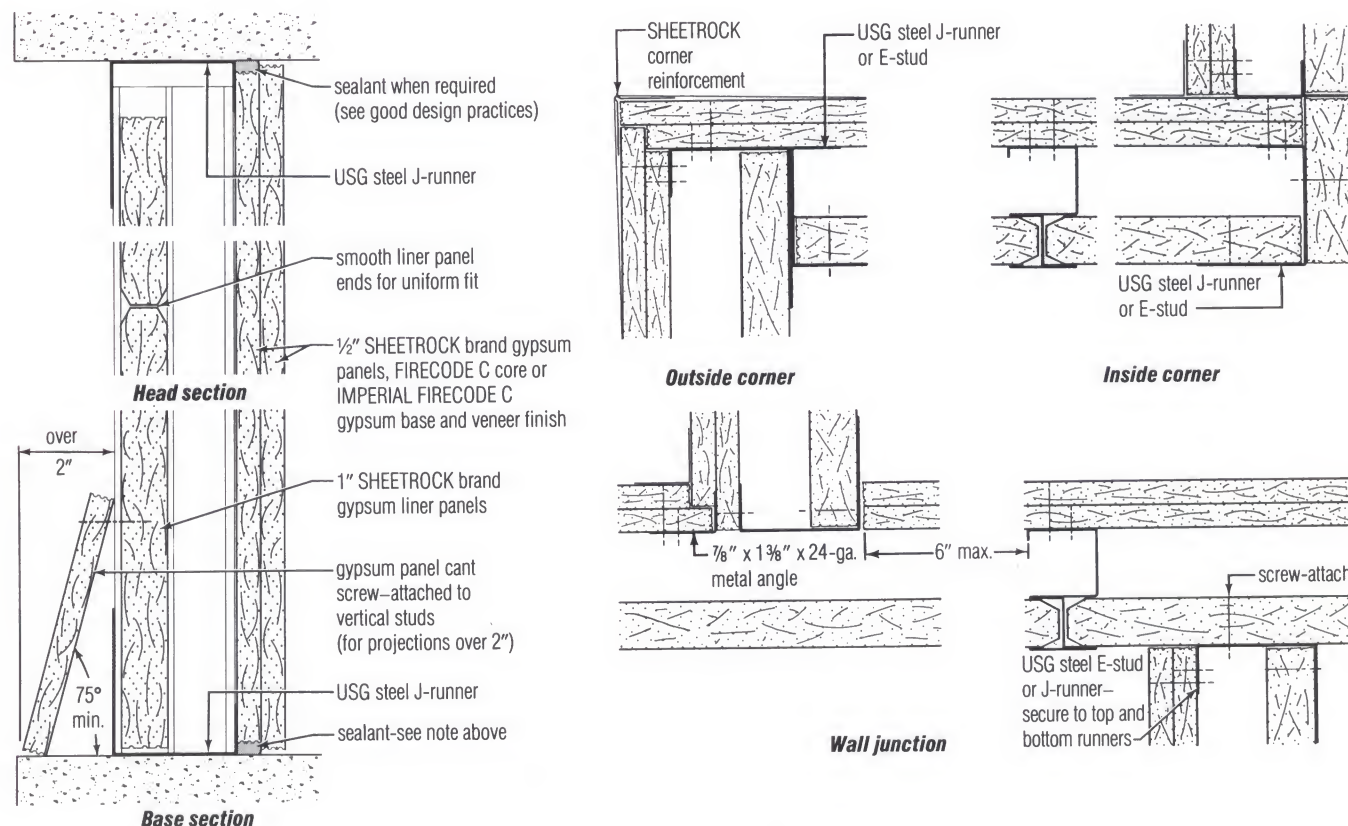
Limiting Heights⁽¹⁾—Shaft Walls

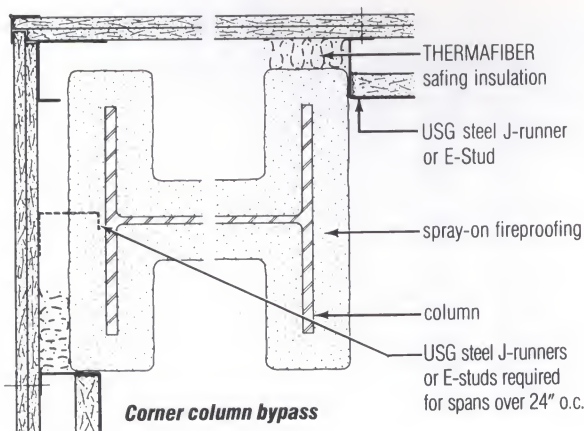
Stud type & size	Designation	Stud spcg.	Allow. defl.	Intermittent air pressure load (wind load)—psf											
				Fire-rated system B, C, D, E, F, G				Fire-rated system D ⁽²⁾				Fire-rated system A ⁽³⁾			
				5	7.5	10	15	5	7.5	10	15	5	7.5	10	15
2½" C-H Studs	212CH25	24"	L/120	14'10"(f)	12'2"(f)	10'6"(f)	8'7"(f)	14'10"(f)	12'2"(f)	10'6"(f)	8'7"(f)	14'10"(f)	12'2"(f)	10'6"(f)*	8'7"(f)*
			L/240	13'8"(f)	11'11"(f)	10'6"(f)	8'7"(f)	13'5"(d)	11'9"(f)	10'6"(f)	8'7"(f)	12'5"(d)	10'10"(d)	9'10"(d)	8'7"(f)*
			L/360	11'11"(d)	10'5"(d)	9'6"(d)	8'3"(d)	11'9"(d)	10'3"(d)	9'4"(d)	8'2"(d)	10'10"(d)	9'6"(d)	8'7"(d)	7'6"(d)*
	212CH22	24"	L/120	18'0"(f)	14'8"(f)	12'9"(f)	10'5"(f)	17'2"(d)	14'8"(f)	12'9"(f)	10'5"(f)	17'2"(d)	14'8"(f)	12'9"(f)	10'5"(f)
			L/240	14'11"(d)	13'0"(d)	11'10"(d)	10'4"(d)	13'7"(d)	11'11"(d)	10'10"(d)	9'5"(d)	13'7"(d)	12'11"(d)	10'10"(d)	9'5"(d)
			L/360	13'0"(d)	11'5"(d)	10'4"(d)	9'0"(d)	11'11"(d)	10'5"(d)	9'5"(d)	8'3"(d)	11'11"(d)	10'5"(d)	9'5"(d)	8'3"(d)
	212CH20	24"	L/120	19'2"(d)	15'9"(f)	13'8"(f)	11'2"(f)	17'7"(d)	15'5"(d)	13'8"(f)	11'2"(f)	17'7"(d)	15'4"(d)	13'8"(f)	11'2"(f)
			L/240	15'3"(d)	13'4"(d)	12'1"(d)	10'7"(d)	14'0"(d)	12'3"(d)	11'1"(d)	9'8"(d)	14'0"(d)	12'2"(d)	11'1"(d)	9'8"(d)
			L/360	13'4"(d)	11'7"(d)	10'7"(d)	9'3"(d)	12'3"(d)	10'8"(d)	9'0"(d)	8'6"(d)	12'2"(d)	10'8"(d)	9'8"(d)	8'6"(d)
4" C-H Studs	400CH25	24"	L/120	20'0"(f)	16'4"(f)	14'1"(f)	11'6"(f)	20'0"(f)	16'4"(f)	14'1"(f)	11'6"(f)	19'3"(d)	16'4"(f)	14'1"(f)*	9'7"(v)*
			L/240	16'3"(d)	14'3"(d)	12'11"(d)	11'3"(d)	16'3"(d)	14'3"(d)	12'11"(d)	11'3"(d)	15'4"(d)	13'4"(d)	12'2"(d)	9'7"(v)
			L/360	14'3"(d)	12'5"(d)	11'3"(d)	9'10"(d)	14'3"(d)	12'5"(d)	11'3"(d)	9'10"(d)	13'4"(d)	11'8"(d)	10'7"(d)	9'3"(d)
	400CH20	24"	L/120	22'10"(d)	20'0"(d)	18'2"(d)	15'0"(f)*	23'7"(d)	20'7"(d)	18'5"(d)	15'0"(f)*	22'0"(d)	19'3"(d)	17'6"(d)*	15'0"(f)*
			L/240	18'2"(d)	15'10"(d)	14'5"(d)	12'7"(d)	18'9"(d)	16'4"(d)	14'10"(d)	13'0"(d)	17'6"(d)	15'3"(d)	13'11"(d)	12'2"(d)*
			L/360	15'10"(d)	13'10"(d)	12'7"(d)	11'0"(d)	16'4"(d)	14'3"(d)	13'0"(d)	11'4"(d)	15'3"(d)	13'4"(d)	12'2"(d)	10'7"(d)*
double 6" E-Studs	600ES25	24"	L/120	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)
			L/240	26'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'6"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)
			L/360	23'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)
	600ES20	24"	L/120	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*
			L/240	28'0"(c)	26'3"(d)*	24'0"(d)*	20'0"(v)*	28'0"(c)	26'0"(d)*	23'6"(d)*	20'0"(v)*	28'0"(c)	24'9"(d)	22'6"(d)*	20'0"(v)*
			L/360	26'3"(d)	23'0"(d)	21'0"(d)*	18'3"(d)*	26'3"(d)	22'9"(d)	20'6"(d)*	18'0"(d)*	25'3"(d)	21'9"(d)	19'6"(d)	17'3"(d)*

(1) Table heights also apply to sustained pressures (max. 10 psf) equal to 2/3 of intermittent pressures shown. (2) For assembly with single-layer board both sides of studs. (3) For assembly with single-layer board attached to studs. Limiting criteria: f—bending stress, d—deflection, v—end reaction shear, c—practical limitation. Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c. *Use JR20 runner for heights with asterisk. See page 3 for system references and rated assembly details.

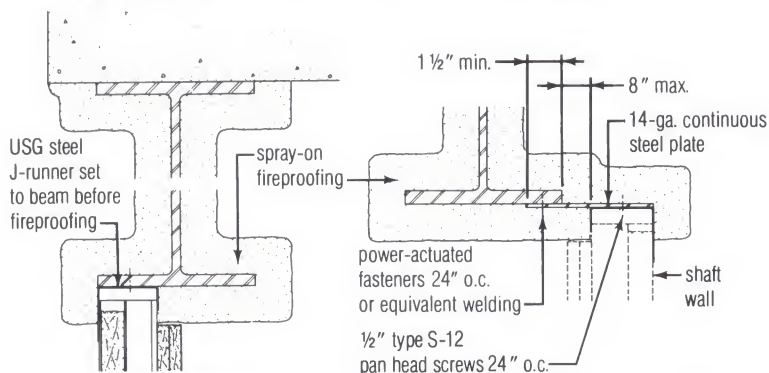
Details

scale: 3" = 1'-0"



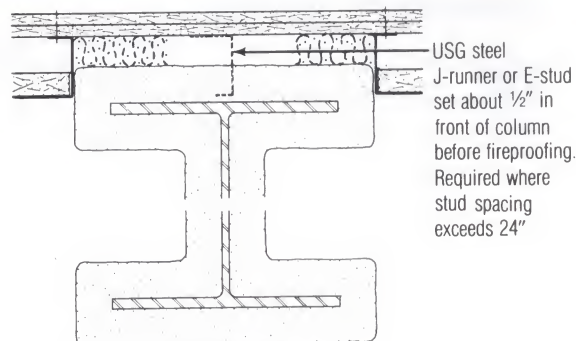


Corner column bypass

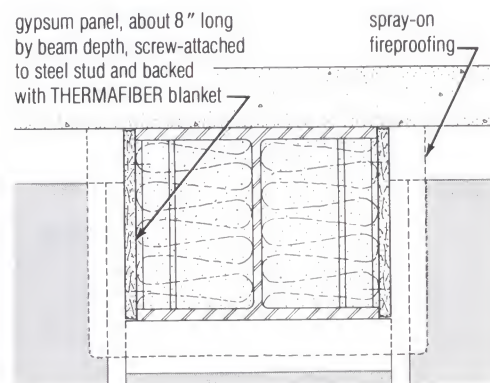


**Steel beam
(2-hr. beam/
2-hr. partition—
see specifications)**

**Steel beam
offset wall**



Column bypass



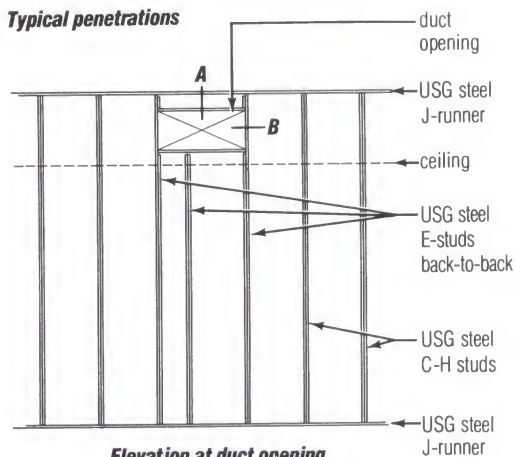
Elevation at boxed beam

Penetration Fire Tests

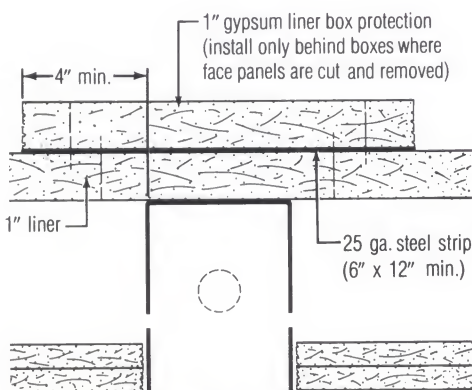
To maintain the integrity of the shaft wall, most services that interrupt the wall must have additional protection against fire. Call-button and floor-indicator penetrations occur in every elevator shaft wall. Boxes for these services usually penetrate the wall and invalidate the fire rating unless supplementary fire protection is added. Details included here successfully achieved a 2-hour fire endurance when tested according to ASTM E119 fire exposure.

Test: CEG 6-15-79. Box size should be compatible with C-H stud size selected (4" studs typically required).

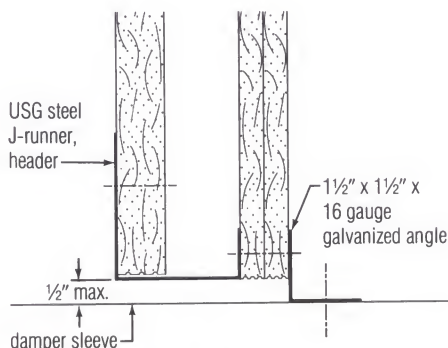
Typical penetrations



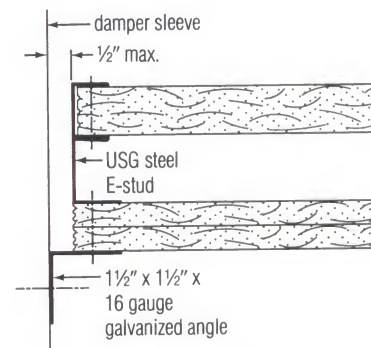
Elevation at duct opening



Call button box

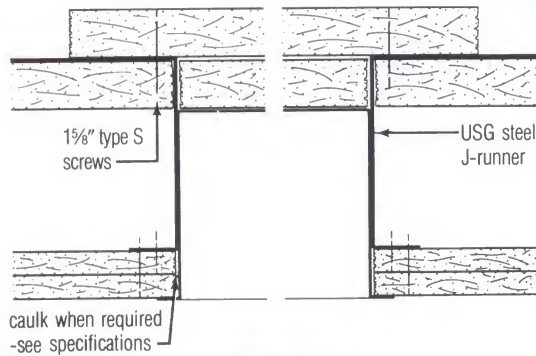
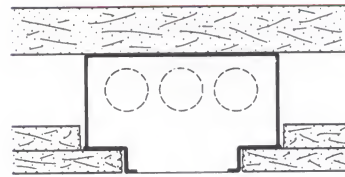
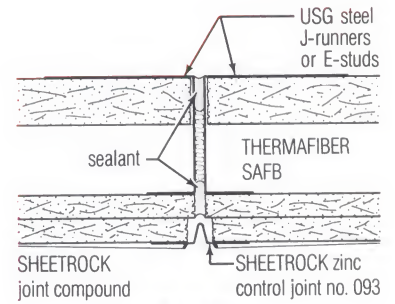
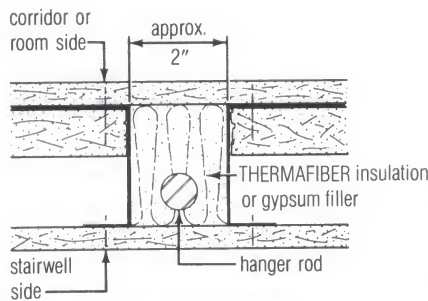
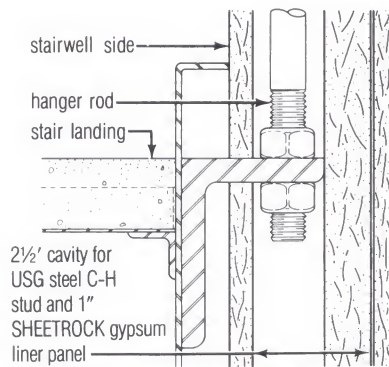
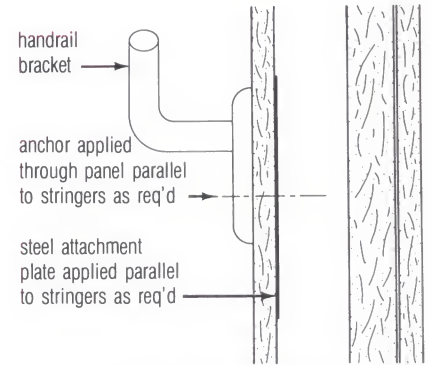


**Section A
1 1/2 hr. fire damper
Tested per U.L. R13479**



**Section B
1 1/2 hr. fire damper
Tested per U.L. R13479**

scale: 3" = 1'-0"

**Mail chute****Outlet box****Control joint****Cross section at stair hanger****Stair hanger rod application****Handrail application**

Air Handling Systems

Gypsum shaft walls have been used for many years to house all types of ducts in the shaft area. Their fire-resistant features plus economical dry construction make them ideal for this use. Today shaft walls are used successfully without a metal liner for handling return air in HVAC systems. To function properly, shaft wall systems should be designed with the following performance provisions.

- 1 Gypsum board surface temperature does not exceed 125°F.
- 2 Air stream dew point temperatures are maintained below gypsum board surface temperature.
- 3 The assembly is constructed to withstand sustained design uniform air pressure loads not exceeding 10 psf. Start up surge loads should not be greater than 1 1/2 times the design static load. (See table at right for limiting heights).
- 4 Separate approved liners should be installed in areas subject to continuous moisture overspray, condensation or air stream temperature over 125°F.

Limiting Heights⁽¹⁾—Unlined Return Air Shafts

Stud type & size	Designation	Stud spcg.	Allow. defl.	Sustained pressure load—psf			
				2-hr. fire-rated system		1-hr. fire rated system	
				5	10	5	10
2 1/2" C-H Studs	212CH25	24"	L/120	12'2"	8'7"	12'2"	8'7"
			L/240	11'11"	8'7"	12'2"	8'7"
			L/360	10'5"	8'3"	9'6"	7'6"
	212CH22	24"	L/120	14'8"	10'5"	14'8"	10'5"
			L/240	13'0"	10'4"	11'11"	9'5"
			L/360	11'5"	9'0"	10'5"	8'3"
4" CH Studs	212CH20	24"	L/120	15'9"	11'2"	15'4"	11'2"
			L/240	13'4"	10'7"	12'2"	9'8"
			L/360	11'7"	9'3"	10'8"	8'3"
	400CH25	24"	L/120	16'4"	11'6"	16'4"	9'7"
			L/240	14'3"	11'3"	13'4"	9'7"
			L/360	12'5"	9'10"	11'8"	9'3"
double 6" E-Studs	400CH20	24"	L/120	20'0"	15'0"	19'3"	15'0"
			L/240	15'10"	12'7"	15'3"	12'2"
			L/360	13'10"	11'0"	13'4"	10'7"
	600ES25	24"	L/120	18'9"	9'3"	18'9"	9'3"
			L/240	18'9"	9'3"	18'9"	9'3"
			L/360	18'9"	9'3"	18'9"	9'3"
	600ES20	24"	L/120	28'0"	20'0"	28'0"	20'0"
			L/240	26'3"	20'0"	24'9"	20'0"
			L/360	23'0"	18'3"	21'9"	17'3"

Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c.

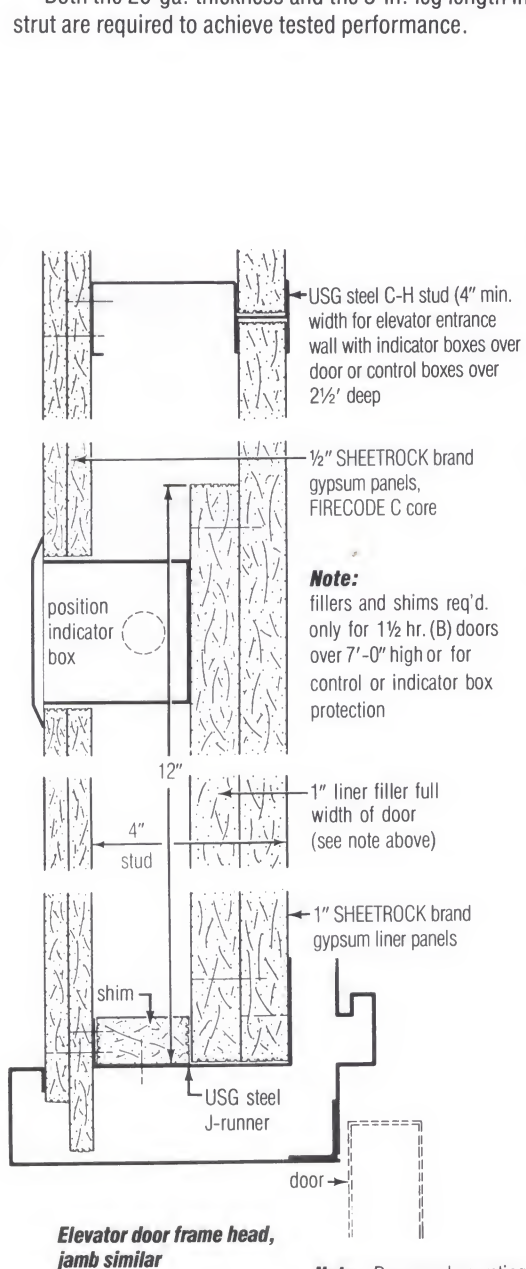
*Use JR20 runner for heights with asterisk.

Elevator Door and Frame Assemblies

Typically, for buildings of four stories or more, building codes require a 1½-hour "B" rating for elevator entranceways in a 2-hour rated shaft wall. Certain firms have conducted fire tests with their door and frame assemblies in USG Cavity Shaft Walls—UL Design U438 rated 2-hours. These door assemblies comply with the safety code for elevators and dumbwaiters ANSI A17.1 and have been tested per ASTM E152. Specific door jamb studs, jamb struts and installation methods are required for fire-rated construction. See entrance manufacturer for details. When specifying door frame assemblies, also specify installation in the shaft wall in which assemblies were performance-tested.

There have been many successful UL tests on door assemblies in USG Cavity Shaft Walls, some are shown at right. In every successful test, the interface between the entranceway and shaft wall was constructed with a 20-ga. jamb strut having a 3-in. leg, installed at the door jamb (see details).

Both the 20-ga. thickness and the 3-in. leg length in the jamb strut are required to achieve tested performance.



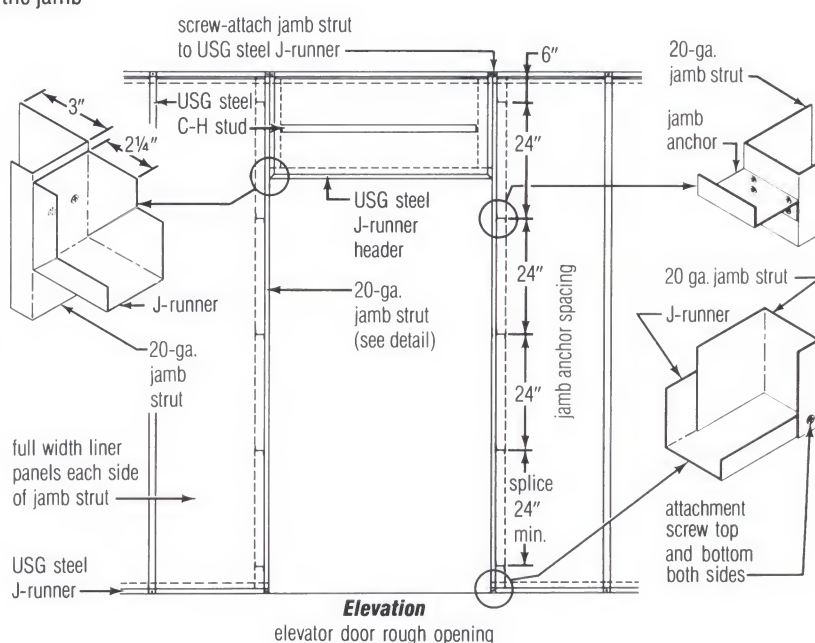
Note: Doors and operating accessories to be hung or supported separately.

Shaft Wall Entranceway Assemblies—1½-hr. Fire Rated

manufacturer	maximum opening size	door type	UL file no.
Otis	42"x84"	center opening	R7416
Otis	48"x100½"	two-speed slide	R7416
Otis	48"x102"	center opening	R7416
Westinghouse	48"x102"	center opening	R8176
Dover	42"x96"	single slide	R6155
Dover	48"x96"	center opening	R6155
Tyler	42"x102"	single slide	R6403
Tyler	60"x108"	center opening	R6403
D A Matot	48"x78"	dumbwaiter	R6748
Hauenstein & Burmeister	48"x108"	center opening	R4153
Courion Industries	48"x84"	dumbwaiter	R2317
General Elevator	48"x84"	center opening	R10483
Columbia	42"x108"	single slide	R9642
Columbia	48"x108"	center opening	R9642

Note: Entranceways tested with UL Design U438 shaft wall and achieved a 1½-hour "B" rating.

Apparent duplications are a result of tests involving different types or styles of either frames or doors.



Horizontal Shaft-Wall Assemblies

USG Cavity Shaft Walls installed horizontally provide economical construction for fire-resistive duct protection, corridor and other ceilings and stairway soffits. Also ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above. With 1" liner panels inserted in C-H/CH-L Studs 24" o.c. and triple-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the system provides greater spans and 2-hr. protection from fire either inside or outside the duct. **Test No.: CEG-12-10 and 12-16-82.**

With double-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the assembly provides suitable 2-hour fire-resistive ceiling construction for corridors and stairs (see details).

One-hour fire-rated construction is offered with single-layer ⅝" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

Limitations

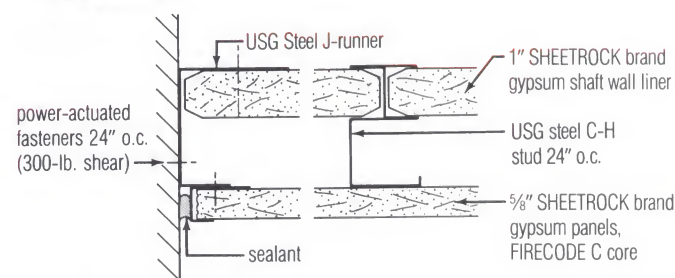
- 1 USG C-H Studs are not designed to carry live loads or mechanical equipment or provide material storage area.
- 2 Maximum stud spacing is 24" o.c.; maximum spans are shown in table below.

Limiting Spans—Horizontal Shaft Walls⁽¹⁾

Stud style	Single-layer 5/8" gypsum panels ⁽²⁾	Double-layer 1/2" gypsum panels ⁽²⁾	Triple-layer 1/2" gypsum panels ⁽³⁾
212CH25	7'3"	7'2"	7'1"
212CH22	9'4"	8'6"	7'11"
212CH20	10'3"	9'2"	8'3"
400CH25	10'0"	9'1"	9'10"
400CH20	14'6"	13'2"	12'0"

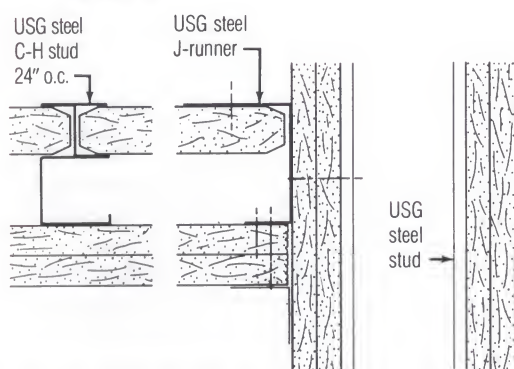
(1) Based on L/240 allowable deflection and JR24 runner. (2) Allowable steel stress reduced 50%. (3) Full steel stress allowed based on ASTM E119.

1-Hr. fire rated assembly per NER 258



Corridor ceiling and stair soffit

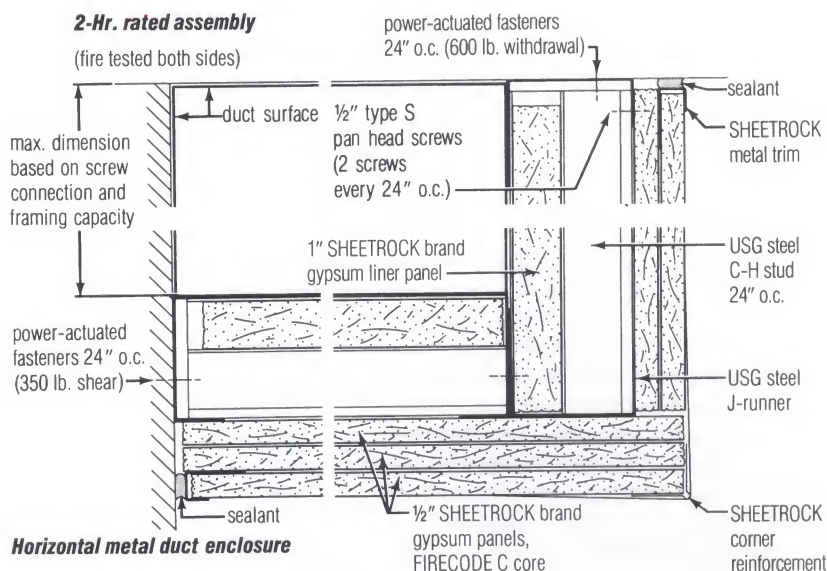
2-Hr. fire rated assembly per NER 258



Corridor ceiling and stair soffit

2-Hr. rated assembly

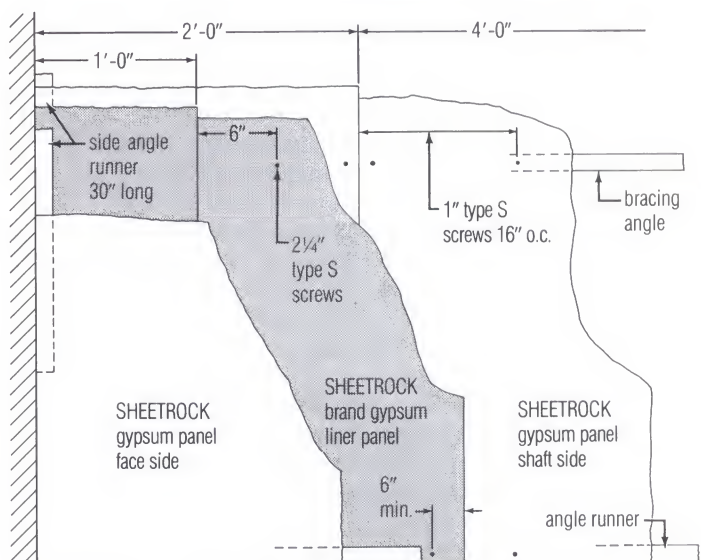
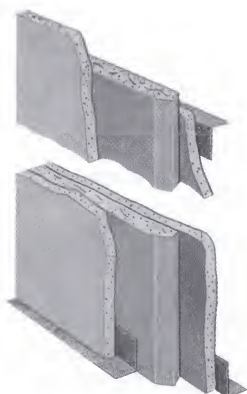
(fire tested both sides)



Horizontal metal duct enclosure

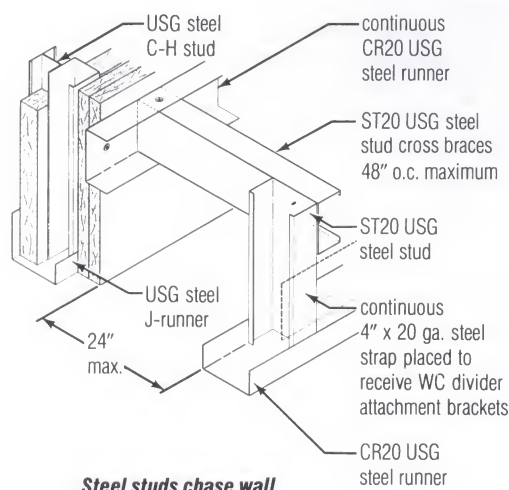
Vent Shaft Enclosure

USG Vent Shaft System provides a vent enclosure for vertical shafts in apartments and other types of multi-story buildings. The 2-hr. fire rating meets UL Design U505. This shaft assembly is particularly suited for structures having a number of relatively small and widely separated mechanical, service and ventilator shafts. USG Shaft Walls are preferred where service and mechanical lines and equipment are consolidated within the building core.

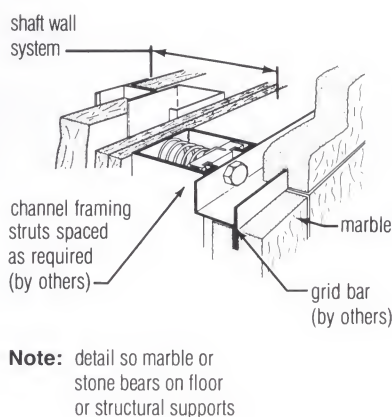


Vent shaft elevation

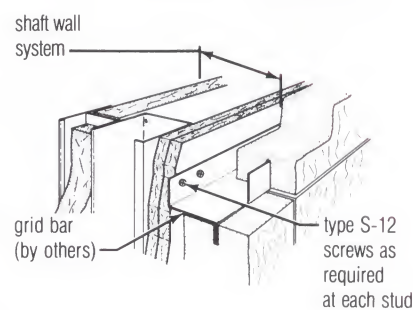
Miscellaneous Details



Steel studs chase wall



Channel with grid bar attachment



Grid bar attachment

Good Design Practices

- 1 System Performance**—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
- 2 Control Joints**—Shaft wall surfaces should be isolated with control joints or other means where: (a) construction changes within the plane of the shaft wall; (b) shaft wall run exceeds 30'. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.
- 3 Penetrations** of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used. Penetrations greater than 48" wide require supplemental support for the shaft wall at the opening. Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.
- 4 Pressure Loads**—Where shaft walls enclose elevator and return air vents, and intermittent pressures up to 15 psf are expected, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement. Shaft walls may be used for air handling with sustained pressures up to 10 psf. Sealant selection including joint treatment, surface coatings and details to seal the wall under these sustained pressures must be provided by the designer. When air pressure exceeds 10 psf, the air handling should be contained with a metal duct.
- 5 Screws**—Type S Screws are suitable for gypsum panel or gypsum base attachment to 25, 22 and 20-ga. steel studs. Type S-12 screws should be specified for other applications to steel heavier

than 20-ga. Screw lengths should be 1" for base layer and 1½" for face layer and at least ⅜" longer than the total thickness for other applications.

- 6 Steel Frame Construction**—Runners and studs attached to beams and columns should be installed before steel is spray-fireproofed. Excess fireproofing should be removed from runners and studs before installing shaft wall liner and sealant.
- 7 Steel door frames**, ordered separately, should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of the shaft wall plus ⅜" minimum. They should be anchored at floor with 16-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 18-ga. steel welded in jamb and screw-attached to struts.
All one-piece frames should be spot-grouted after shaft wall liner is installed. Apply SHEETROCK Setting-Type Joint Compound just before inserting face layer into frame. If necessary, cut out board to provide relief at jamb anchor. Do not terminate panels against trim return. Provide bracing where required by installing diagonal bracing from jamb strut-studs to structure.
- 8 Height**—Where cavity shaft wall height exceeds max. available panel height, liner panel end joints should be positioned within the upper and lower third-points of wall. Joints may be butted together or reinforced with horizontal C-H stud or USG H-spline cut to fit between adjacent vertical studs. Walls over 16' high should have studs screw-attached to runners. Also, joints in adjacent panels should be staggered top and bottom to prevent a continuous horizontal joint.
- 9 Electric Boxes**—Cavity shaft walls will accommodate outlet boxes with depths up to the stud width.
- 10 Additional Information**—See technical folders in this series: Construction Selector SA-100 for fire and sound-rated systems; Gypsum Panels Folder SA-927 for shaft wall components and joint system specifications; Plaster Products, Systems and Accessories SA-920 for lath and plaster specifications; and Texture and Finish Products Folder SA-933 for finishing product specifications.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed instructions.

The UNIMAST products identified in this catalog are exclusively marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

- A** In cold weather during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.
- B** For gypsum base and veneer finish application, SHEETROCK Setting-Type Joint Compound and SHEETROCK Joint Tape shall be used on all joints and internal corners and allowed to set thoroughly before plaster application.

1.5 Protection

All materials shall be suitably protected from the weather during installation to prevent damage to the shaft wall.

Part 2: Products**2.1 Materials**

- A** Liner Board—1" SHEETROCK brand Gypsum Liner Panels, beveled edge, 24" wide, lengths as required.
- B** Faceboards—(1/2") (5/8") thick, 48" wide, SHEETROCK brand Gypsum Panels, FIRECODE C, lengths as required.
- C** Gypsum Base—(1/2") (5/8") thick, 48" wide, square-edge IMPERIAL FIRECODE C Gypsum Base, lengths as required.
- D** Joint Treatment—(select a United States Gypsum Company Joint System).
- E** Fasteners—Screws: (3/8") (1/2") Type (S) (S-12) pan head; 5/8" Type S-12 low profile head; (1") (1 1/8") (2 1/4") Type S bugle head. DUROCK Steel Screws: 1 5/8".
- F** SHEETROCK Metal Trim—No. (200A) (200B) (401) (402) (701B) (801B).
- G** SHEETROCK Corner Bead—(DUR-A-BEAD) (No. 800) (No. 900).
- H** UNIMAST Metal Furring Channels.
- I** RC-1™ Resilient Channels.
- J** USG Steel C-H Studs, (212CH25) (212CH22) (212CH20) (400CH25) (400CH20) hot-dipped galvanized, lengths as required (select from tables).
- K** USG Steel E-Studs, (212ES25) (212ES20) (400ES25) (400ES20) (600ES25) (600ES20) hot-dipped galvanized, lengths as required (select from tables).
- L** USG Steel J-Runners, (212JR24) (400JR24) (600JR24) (212JR20) (400JR20) (600JR20) hot-dipped galvanized, for USG Steel C-H and E-Studs.
- M** Steel Jamb Struts, (212JS20) (400JS20) (600JS20) hot-dipped galvanized (for elevator door framing).
- N** Runner Fasteners, power-driven type, to withstand 193 lb. single shear and 200 lb. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (obtain locally).
- O** SHEETROCK Acoustical Sealant.

- P** THERMAFIBER Sound Attenuation Fire Blankets—(1") (1 1/2") 24"x48".
- Q** SHEETROCK Zinc Control Joint 093.
- R** Cement Board—DUROCK Interior Cement Board, 1/2" thickness, 36" width x (48") (60") (72") length.
- S** Organic Adhesive, Type I—DURABOND D-2001 Multi-Purpose Ceramic Tile Mastic (meets ANSI A136.1 Type I requirements).

Part 3: Execution**3.1 Cavity Shaft Wall Erection**

A Studs and Liner Panels—Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power driven fasteners at both ends and max. 24" o.c. With steel frame construction, install floor and ceiling runners and J-Runners or E-Studs on columns and beams before steel is fireproofed. Remove spray-fireproofing from runners and E-Studs before installing gypsum liner panels (2-hour steel fireproofing). For other structural steel fireproofing requirements, use Z-shaped stand-off clips secured to structural steel before fireproofing application.

Cut liner panels 1" less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed max. available panel height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels. Screw attach studs to runners on walls over 16' high.

Use steel C-H studs 3/8" to not more than 1/2" less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove. Install full-length steel E-Studs or J-Runners vertically at T-intersections, corners, door jams, and columns. Install full-length E-Studs over gypsum liner panels both sides of closure panels. For openings, frame with vertical E-Stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

Install floor-to-ceiling steel J-Runners or E-Studs each side of steel hinged door frames and jamb struts each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two 3/8" Type S-12 pan head screws. Attach strut-studs to jamb anchors with 1/2" Type S-12 screws. Over steel doors, install a cut-to-length section of J-Runner and attach to strut-studs with 3/8" Type S-12 screws.

B Resilient Channels—Install RC-1 Resilient Channels horizontally to face of studs, within 6" of floor and ceiling and max. 24" o.c. Attach channels to studs with 3/8" Type S screws driven through holes in mounting flange. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice. Install 1/2" x 3" wide continuous gypsum filler strips to top and bottom runner.

For resiliently attached finish, apply base layer horizontally to resilient channels with end joints staggered; fasten with 1" Type S screws 12" o.c. Apply face layer vertically with joints staggered; attach to channels with 1 1/8" Type S screws 12" o.c.

C Gypsum Panels—For single layer finish, erect 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, on corridor side. Fasten to studs and runners with 1" Type S screws 12" o.c.

For double-layer finish, erect 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base vertically or horizontally one side of studs. Fasten base layer to studs with 1" Type S screws 24" o.c. Caulk perimeter of base layer.

Apply 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base face layer vertically over base layer with joints staggered and attached with 1 1/8" Type S

screws staggered from those in base, spaced 12" o.c. and driven into studs and runners. Over horizontally applied base layer drive Type G screws through face layer above and below joint in base layer, midway between studs.

Where both sides of shaft wall are finished, apply 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels or base with 1" Type S screws spaced 12" o.c. in field and along edges.

For triple-layer finish, erect base layer vertically one side of studs, mid layer horizontally with joints staggered and face layer vertically with joints staggered. Attach gypsum panels or base to studs with 1" Type S screws 24" o.c. for base layer, 1 5/8" Type S screws 24" o.c. for mid layer and 2 1/4" Type S screws 16" o.c. for face layer. Attach face layer to J-Runners with 2 1/4" Type S screws 12" o.c.

- D Fire-Rated 4-hr. Assembly**—For 4-hr. assembly, erect steel runners, steel studs and liner panels as described in section A, then continue construction as follows:

Position second layer liner panels vertically over studs and fasten to studs and runners with 1 5/8" Type S screws spaced 6" from top and bottom and 24" o.c. Apply 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base layer vertically over liner panels; attach with 2 1/4" Type S screws staggered from screws in liner panel layer, spaced 24" o.c. and driven into studs.

Install metal furring channels horizontally over gypsum panel or base at ceiling and spaced 24" o.c. vertically. Fasten top channel to studs and runner with 2 1/4" Type S screws spaced 12" o.c. and alternated on channel flanges. Fasten other channels to studs with screws 24" o.c. in top channel flange.

Install second layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base vertically over furring channels with vertical joints staggered 24" from joints in first layer. Fasten panels or base to channels with 1" Type S screws spaced 1" from vertical edges, 12" o.c. in top channel and 24" o.c. in other channels. Install face layer vertically over second layer with vertical joints staggered 24" and fasten to furring channels with 1 5/8" Type S screws located 3/4" and 6" from edges and spaced 12" o.c. in between.

- E Vent Shaft Enclosure**—Align floor, ceiling and sidewall runners according to partition layout. Fasten runners securely to structural supports with suitable fasteners 24" o.c. Install 1 5/8" USG Steel Runners at ceiling by fastening through web. Install 1 3/8" x 7/8" x 24-ga. galvanized steel angles as runners on floor and sidewalls by fastening through their short legs. As an alternate, steel angles may be used as ceiling runners. Install side angle runners 30" long and centered for attachment of horizontal bracing angles.

Install 1 3/8" x 7/8" x 24-ga. galvanized steel bracing angles horizontally at quarter-points between floor and ceiling and spaced max. 5' o.c. Position long leg vertically for board attachment and fasten to sidewall angle with 1" Type S screws.

Install 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, vertically on shaft side and fasten to angles and runners with 1" Type S screws 16" o.c. Apply a SHEETROCK Setting-Type Joint Compound or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed, on back side of coreboard and strip or sheet-laminate to shaft-side board with vertical joints offset 12" from inner board joints.

Install second set of floor and sidewall angle runners (and ceiling angles, if required) with long legs against coreboard. Attach coreboard to runners and angles with 2 1/4" Type S screws 12" o.c. and at least 6" away from coreboard edges.

Using strip or sheet method, laminate floor-side face board to coreboards. Install face boards vertically with joints offset 12" from coreboard joints. Apply moderate pressure when placing boards to assure good adhesive bond. Fasten to coreboard with 1 1/2" Type G screws.

Drive screws approx. 24" from ends of boards and 36" o.c. along lines 1/2" from vertical edges. Temporary nails or support bracing installed 16" to 24" o.c. may be used instead of screws to maintain bond until adhesive is hard and dry. After all attachments are made, wipe off any adhesive forced out at joints and edges. Caulk perimeter of face panels with SHEETROCK Acoustical Sealant to prevent air infiltration. If desired, complete the assembly with the appropriate drywall or veneer finish application.

3.2 Accessory Application

- A Gypsum Panel Joints**—Finish all face layer joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.
- B Gypsum Base Joints**—Use SHEETROCK Setting-Type Joint System installed according to manufacturer's directions.
- C Corner Bead**—Reinforce all vertical and horizontal exterior corners with corner bead fastened with clinch-on tool or staples 9" o.c. on both flanges along entire length of bead.
- D Metal Trim**—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 9" o.c.
- E Screws**—Power-drive at least 3/8" from edges or ends of gypsum panels to provide uniform dimple 1/32" deep. In gypsum base, set flush with surface without tearing face paper.
- F Control Joints**—Break panels behind joint. Apply acoustical sealant to fill gap and attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

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United States Gypsum Company
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A Subsidiary of USG Corporation

Gypsum Panels & Accessories

There is only one SHEETROCK—the brand of gypsum panels for interior walls and ceilings developed and constantly improved by United States Gypsum Company. This product, in the last 40 years, has revolutionized construction—to the point that today more than 90% of all new residential buildings are finished with gypsum panels. Systems using SHEETROCK brand Gypsum Panels now have gained the same acceptance in commercial building.

A SHEETROCK brand Gypsum Panel is mill-fabricated and composed of a fire-resistant gypsum core encased in a heavy natural-finish paper on the face side and a strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth.

Gypsum panels are produced in specialized forms for various applications. Complementing these is the industry's broadest line of accessories, adhesives and joint treatment materials to provide complete partition, ceiling and floor assemblies. This catalog covers these products in five groups: (1) Gypsum Panel Products; (2) Trim Accessories; (3) Metal Products; (4) Screws and Adhesives; (5) Joint Treatment and Texture Products. A general specification appears on pages 9-12; detailed data on assemblies using these components are covered in pertinent United States Gypsum Company System Folders.

Interior walls and ceilings built with SHEETROCK brand Gypsum Panels gain a durable surface suitable for most types of decorative treatment and for repeated decoration during the life of the building. Joints between adjacent panels may be reinforced and concealed with a United States Gypsum Company joint treatment system, or featured by leaving exposed or covering with decorative mouldings.

Dry Construction—factory-produced gypsum panels eliminate excessive moisture in construction.

Speed—panels are easily cut and quickly applied.

Quick Decoration—essentially a "dry" material, gypsum panels permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire Protection—the gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F. until completely calcined—a slow process. See Construction Selector SA-100 for fire-resistance ratings.

Crack Resistance—with joints reinforced with a United States Gypsum Company joint system, SHEETROCK brand Gypsum Panels form walls and ceilings highly resistant to cracks caused by frame movement, vibration or minor settling.

Non-Warping—expansion or contraction under normal atmospheric changes is negligible.

Availability—over 20 strategically located operating plants produce and/or stock the gypsum panel materials described here. Special distribution centers, in addition to these plants, increase total service efficiency to major markets and rural areas from coast to coast. All standard or specialty gypsum panel products may be considered readily available and easily procured upon short notice.



General Limitations

- 1 Exposure to excessive or continuous moisture and extreme temperatures should be avoided. Gypsum board is not recommended in solar heating systems where board will be in contact with surfaces exceeding 125°F. (52°C).
- 2 Must be adequately protected against wetting when used as a base for ceramic wall tile (see foil-back panel limitation). Use SHEETROCK brand Gypsum Panels, Water-Resistant, for this purpose.
- 3 Maximum spacing of framing members: ½" and ⅝" gypsum panels are designed for use on framing centers up to 24"; ¾" and 1¼" panels, on centers up to 16". In both walls and ceilings when ½" or ⅝" gypsum panels are applied across framing on 24" centers and joints reinforced, blocking is not required. Neither ¾" nor 1¼" SHEETROCK brand Gypsum Panels are recommended for use on steel framing nor as base for water-based texturing materials. When a water-based texture is used on ceilings with framing 24" o.c., ⅝" gypsum panels, ½" FIRECODE C core panels, or ½" SHEETROCK brand Interior Gypsum Ceiling Board should be used to prevent sag. See System Folders for recommended framing spacing.
- 4 Application of SHEETROCK brand Gypsum Panels over ¾" wood furring applied across framing is not recommended since the relative flexibility of the furring under impact of the hammer tends to loosen nails already driven. Furring should be 2"x2" minimum (may be nom. 1"x4" if panels are to be screw-attached).

- 5 The application of gypsum panels over an insulating blanket, that has first been installed continuously across the face of the framing members, is not recommended. Blankets should be recessed and the blanket flanges attached to sides of studs or joists.
 - 6 To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for 1/2" thick panels with frame spacing 24" o.c.; 2.2 psf for 5/8" panels on 16" o.c. framing and 3/4" panels 24" o.c.; 3/8" thick panels must not be overlaid with unsupported insulation. A vapor retarder should be installed in exterior ceilings, and the plenum or attic space should be properly vented.
- During periods of cold or damp weather when a polyethylene vapor retarder is installed on ceilings behind the gypsum board, it is important to install the ceiling insulation before or immediately after installing the ceiling board. Failure to follow this procedure can result in moisture condensation on the back side of the gypsum board, causing the board to sag.
- 7 To produce final intended results, certain recommendations regarding surface preparation, painting products and systems must be adhered to for satisfactory performance (see good design practices, page 9 for details).
 - 8 Precaution should be taken against creating a double vapor retarder by using gypsum panels as a base for highly water vapor-resistant coverings when the wall already contains a vapor retarder. Moreover, do not create a vapor retarder by such wall coverings on the interior side of exterior walls of air-conditioned buildings in hot-humid climates where conditions dictate a vapor retarder location near the exterior side of the wall. Such conditions require assessment of a qualified mechanical engineer.

Technical Data

SHEETROCK brand Gypsum Panels comply with ASTM C36. Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40°—100°F.); hygrometric coefficient of expansion (unrestrained): 7.2×10^{-6} in. per in. per % r.h. (5%—90% r.h.). Surface burning characteristics: flame spread 15, smoke developed 0.

Gypsum Panel Products

SHEETROCK brand Gypsum Panels have long edges tapered on the face side to form a shallow channel for joint reinforcement. Made in four thicknesses for specific purposes:

- 5/8", recommended for the finest single-layer drywall construction. The greater thickness provides increased resistance to fire and transmission of sound. Recommended for ceilings when a water-based texturing material will be used.
- 1/2", for single-layer application in new residential construction and remodeling.
- 3/8", lightweight, applied principally in the double wall system over wood framing and in repair and remodel work.
- 1/4", a lightweight, low-cost utility gypsum panel, used as base layer for improving sound control in double-layer steel and wood stud

partitions and for use over old wall and ceiling surfaces. Also for forming curved surfaces with short radii.

Width: 4'; length: 8', 9', 10', 12' or 14' (except 1/4", available in 8' and 10' lengths only); edges: tapered; finish: natural-finish face paper, suitable for paint or other decoration.

SHEETROCK brand Gypsum Panels, SW Edge, have an exclusive tapered rounded edge design to help minimize ridging or beading and other joint imperfections and help compensate for extremes of temperature and humidity during construction. The SW system produces a stronger joint than with regular gypsum panels.

This is accomplished by pre-filling gypsum panel joints with SHEETROCK 90 Setting-Type Joint Compound, a formulation which chemically hardens in about 1 1/2 hours, providing maximum bond and minimum shrinkage. No more compound is required than with regular panels. Taping and other application procedures are conventional.

Except for the rounded edge, SW Panels are tapered like, and otherwise identical to, regular tapered-edge gypsum panels. Made in 1/2" and 3/8" thicknesses.

SHEETROCK brand Gypsum Panels, FIRECODE Core, available in the types listed below, comply with ASTM C36 for a Type X gypsum board and meet the definition of a Type X gypsum board for fire-rated assemblies in the Gypsum Association Fire Resistance Design Manual. Width: 4'; length: 8', 9', 10', 12' or 14'; edges: SW tapered, tapered; finish: natural-finish face paper, suitable for paint, wall paper or other decoration.

SHEETROCK brand Gypsum Panels, FIRECODE Core, made 5/8" thick, combine all the advantages of regular panels with additional resistance to fire exposure.

SHEETROCK brand Gypsum Panels, FIRECODE C Core, made in 5/8" and 1/2" thicknesses, provide improved fire protection over standard FIRECODE panels as a result of a specially formulated core containing special additives that enhance the integrity of the core under fire exposure.

Systems using these gypsum panels have qualified for fire ratings of up to 4 hours in walls, 3 hours in ceilings, 4 hours for column protection. Construction Selector shows the many variations of tested assemblies.

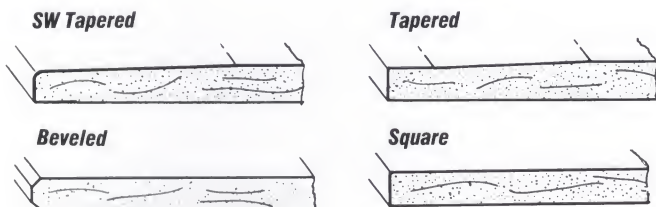
Limitations (also refer to General Limitations, page 1): (1) In order to attain fire-resistance ratings, the construction of the partition and/or floor and ceiling assemblies must conform to the system designs as tested at the indicated fire testing facilities (see System Folders). (2) Max. frame member spacing: 24" o.c.

SHEETROCK brand Gypsum Panels, Foil-Back, are made by laminating special kraft-backed aluminum foil to back surface of regular, SW, FIRECODE and FIRECODE C cores as indicated above. Effective as a vapor retarder for walls and ceilings when applied with foil surface next to the framing in single-layer application or as the base layer in multi-layer systems. SHEETROCK brand Gypsum Panels, Foil-Back, provide a water vapor retarder to help prevent interior moisture from entering wall and ceiling spaces. In tests per ASTM E96 (desiccant method), 1/2" foil-back panels showed a vapor permeance of 0.06 perm.

These panels are designed for interior use with furred masonry, wood or steel framing. In air conditioned buildings in climates having sustained high outside temperature and humidity, a qualified mechanical engineer should determine vapor retarder location.

Limitations: Not recommended as a base for ceramic or other tile or as base layer for TEXTONE Vinyl-Faced Gypsum Panels or other highly moisture-resistant wall coverings. Also not to be used in hot, humid climates such as the Southern Atlantic and Gulf Coast areas.

Thickness: 3/8", 1/2" and 5/8". Sizes, edges and finish: same as for base panels.



SHEETROCK brand Gypsum Panels, Water-Resistant, are a proven water-resistant base for the adhesive application of ceramic and plastic tile and plastic-faced wall panels. Made water-resistant all the way through: (1) multi-layered face and back paper are chemically treated to combat penetration of moisture; (2) the gypsum core is made water-resistant with a special composition. The panel is easily recognized by its distinctive green face.

Gypsum Panel Application and Frame Spacing

thickness	approx. panel weight psf	location	application method	max. frame spacing o.c.
3/8" (1)	1.4	ceilings (2)(3)	perpendicular	16"
3/8" (1)	1.4	sidewalls	perpendicular or parallel	16"
1/2"	1.8	ceilings	parallel (3) perpendicular	16" 24" (4)
1/2"	1.8	sidewalls	perpendicular or parallel	24"
5/8"	2.3	ceilings	parallel (3) perpendicular	16" 24"
5/8"	2.3	sidewalls	perpendicular or parallel	24"

(1) For wood framing only. Also see general limitations, page 1. (2) Not recommended below unheated spaces. (3) Not recommended if water-based texturing material is to be applied. (4) Max. spacing 16" if water-based texturing material is to be applied. If 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is used in place of gypsum panels, max. spacing is 24".

Limitations: adherence to recommendations concerning sealing edges, painting, tile adhesives, framing and installation is necessary for satisfactory performance (see Folder SA-924). Not recommended for ceilings, for single-layer resilient attachment where tile is to be applied or in remodeling unless applied directly to studs. Panels should not be installed over a vapor retarder or on a wall acting as a vapor retarder unless it will not be tiled or finished with an impervious paint. Store in an enclosed shelter and protect from exposure to the elements. Panels are not intended for use in areas subject to constant moisture such as gang showers and commercial food processing; DUROCK Interior Cement Boards are recommended for these uses (see Folder SA-932).

Bending of SHEETROCK brand Gypsum Panels (1)

panel thickness		bending radii with dry panels			
		panel applied with long dimension perpendicular to framing		panel applied with long dimension parallel to framing	
in.	mm	ft	m	ft	m
1/4"	6.4	5' (2)	1.5	15	4.6
3/8"	9.5	7 1/2'	2.3	25	7.6
1/2"	12.7	20' (2)	6.1	—	—

(1) For steel-framed systems and bending with wetted panels, see folder SA-923. (2) Bending two 1/4" pieces successively permits radii shown for 1/4" panels.

NOTE: By moistening the face and back paper thoroughly prior to application, and replacing in the stack for at least one hour, the panel may be bent to still shorter radii. When the panel dries thoroughly, it will regain its original hardness.

Where to use SHEETROCK brand Gypsum Panels

construction	(type) (thickness)	Regular	Regular and SW	FIRECODE	FIRECODE C	Foil-Back (4)	TEXTONE	Water-Resistant (1)
		1/4" 3/8"	1/2" & 5/8"	5/8"	1/2" 5/8"	3/8" 1/2" & 5/8"	1/2" & 5/8"	1/2" & 5/8"
Walls								
Exterior Walls—Single Layer								
masonry (furred)			X	X	X X	X	X (4)	X
wood framing			X	X	X X	X	X (4)	X
rigid insulation board			X					X
Exterior Walls—Double Layer								
masonry (furred)			X		X X	X (2)	X (2)	
base		X X	X	X	X X	X (2)	X (2)	
finish			X	X	X X		X (3)(4)	
wood framing			X	X	X X	X (2)	X (2)	
base		X X	X	X	X X		X (3)(4)	
finish			X	X	X X			
Interior Walls—Single Layer								
over existing walls	X X		X	X	X X		X	
masonry (furred)			X	X	X X		X	
wood framing			X	X	X X		X	X
steel framing			X	X	X		X	X
masonry & concrete (direct)			X				X	X
Interior Walls—Double Layer								
masonry (furred)			X	X	X X			
base			X	X	X X			
finish		X X	X	X	X X	X		X
wood framing			X	X	X X			
base	X X	X	X	X	X X			
finish		X	X	X	X X	X		X
steel framing			X	X	X X			
base	X	X	X	X	X X			
finish		X	X	X	X X	X		X
Ceilings								
Ceilings—Single Layer								
over existing ceiling	X X				X X	X X		
wood framing		X	X	X	X X	X X		
steel framing		X		X	X X	X		
Ceilings—Double Layer								
wood framing								
base	X	X	X	X	X X	X X		
finish		X	X	X	X X			
steel framing								
base		X	X	X	X X	X		
finish		X	X	X	X X			
Ceilings—Acoustical Base								
over suspended metal grillage		X	X	X	X X			
over channel		X	X	X	X X			

(1) Recommended as a base for ceramic or other tile. (2) Not recommended as a base for ceramic tile or as a base layer for TEXTONE Vinyl-Faced Gypsum Panels in double-layer systems. (3) Not recommended over a vapor retarder. (4) Not recommended in hot-humid climates.

Available in 1/2" and 5/8" thickness; in 1/2" SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core, to provide fire resistance for UL Design Nos. U307, U317, U603, U612, and U613; and in 5/8" SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE Core, to provide fire resistance for UL Design Nos. U301, U302, U305, U321, U411, U465, U504, U505, U506, U512, U513, U515, U603, U604, U606, U607, U609, U615, U616, U617, U622, U625, U633, U637, X508 and X516. Surface burning characteristics: flame spread 20, smoke developed 0. Comply with ASTM C630. Width: 4'; length: 8', 10' or 12'; edges: tapered; finish: green treated paper, suitable for receiving tile, paint or wallpaper.

TEXTONE Vinyl-Faced Gypsum Panels are conventional gypsum panels with factory-applied vinyl facings in a wide range of coordinated decorator colors. The panels are used for predecorated permanent partitions, relocatable partitions or in remodeling. Not recommended as a finish layer over foil-back gypsum panels or on exterior walls in hot and humid climates unless suitable vapor control is provided by mechanical engineer. See Technical Folder SA-928 for descriptions and specifications.

SHEETROCK brand Gypsum Coreboard has a 1" thick gypsum core encased in strong, gray paper on both sides. It is used in laminated gypsum partitions with additional layers of gypsum panels applied to the coreboard to complete the wall assembly. Manufactured with "V" T&G edges for use in solid partitions or with square edges and prescored 6" to 8" o.c. Coreboard strips are then easily snapped and separated from this master unit. Thickness: 1"; width: 24"; edges: "V" T&G or square; length: 8', 9', 10' and 12' (prescored—7' 8" lengths only); finish: gray paper, unsuitable as exposed surface. (Special order availability prevails in some markets.) Meets ASTM C442.

SHEETROCK brand Gypsum Liner Panels have a special 1" thick gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Used in Shaft Wall Partitions (see Folder SA-926), Area Separation Walls (see Folder SA-925) and High-Attenuation Double Wall Systems (see Folder SA-922). Panels have beveled edges, are 1" thick, 24" wide, and in lengths up to 16' (14' in some markets).

SHEETROCK brand Exterior Gypsum Ceiling Board is a weather- and sag-resistant board designed for the soffit side of eaves, canopies and carports and other commercial and residential exterior applications with indirect weather exposure. It is noncombustible, is simply scored and snapped for quick application, and offers excellent paintability. Surface burning characteristics: flame spread 20, smoke developed 0. Meets ASTM C931.

Installed conventionally in wood and steel-framed soffits; batten strips or mouldings used over butt joints or treated joints; backing strips required for small vent openings. Has beige, water-repellent face paper. Thickness: 1/2"; widths: 4'; lengths: 8' and 12'; edges: SW tapered. Also available 5/8" thick with FIRECODE core which is suitable for fire-rated assemblies.

1/2" SHEETROCK brand Interior Gypsum Ceiling Board supports water-based spray texture paints and insulation like 5/8" thick board but with in-place construction costs that are less. Special gypsum core contains additives which increase sag-resistance. Lightweight for easy handling. Surface burning characteristics: flame spread 15, smoke developed 0. Thickness: 1/2"; width: 4'; lengths: 8' and 12'; edges: tapered. Meets ASTM C36.

SHEETROCK brand Gypsum Sheathing is a fire-resistant gypsum board, 1/2" thick, with water-resistant gypsum core encased in specially formulated brown water-repellent paper on both sides and long edges. Its weather resistance, water repellence, fire resistance and low applied cost make it suitable for use in exterior curtain wall construction; also a popular choice for wood-framed garden apartments and light commercial buildings (see Folder SA-924 for application and specifications). Meets ASTM C79. Available 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' and 9' lengths with square edges. Available on special order: 5/8" thick asphalted core (or water-resistant core) and 5/8" FIRECODE core sheathing boards and in lengths up to 12'.

GYP-LAP Gypsum Sheathing is a weather- and fire-resistant board used in exterior curtain walls and in frame construction (see Folder SA-924). Lightweight board has noncombustible gypsum core clad in water-repellent paper on face and back surfaces. Meets ASTM C79. Available in western U.S., 1/2" thick, 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' length with square edges. Available on special order: 5/8" thick FIRECODE core sheathing board.

Sheathing Limitations

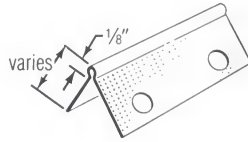
- 1 Sheathing may be stored outside for up to one month, but must be stored off the ground and have protective covering.
- 2 Maximum stud spacing is 24" o.c.
- 3 When applied to a structure, sheathing must not be left exposed to the elements for more than one month unless the procedure as outlined in limitation 6 is followed.
- 4 Exterior finish systems must be properly caulked for the life of the job, particularly around all cuts.
- 5 Exterior finish systems applied over gypsum sheathing must be applied with mechanical fasteners through the sheathing into the wall framing. Alternate methods of application are not endorsed and their performance and that of the substrate are solely the responsibility of the specifier. Direct application of paint, texture finishes and coatings over gypsum sheathing not recommended.
- 6 For in-place exposure up to six months, all gaps resulting from cuts, corners, joints and machine end cuts of the sheathing should be filled with exterior caulk *at time of erection*.
- 7 For curtain wall construction, cover gypsum sheathing with No. 15 asphalt felt within 30 days of sheathing erection. Felt should be applied horizontally with 2" overlap and immediately anchored with metal lath, masonry ties or corrosion-resistant screws or staples.
- 8 Sheathing for exterior ceilings and soffits is not recommended, unless covered with metal lath and exterior stucco.



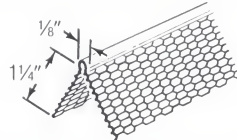
Trim Accessories*

DUR-A-BEAD Corner Bead

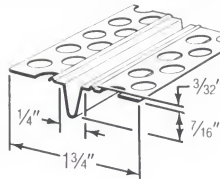
Part of the family of SHEETROCK Metal Products. All-metal galvanized steel reinforcement, protects external corners. Concealed with United States Gypsum Company joint compounds for a smooth, finished corner. Provides superior joint compound adhesion. Available in two flange widths: No. 103 1 1/4"x1 1/4" and No. 104 1 1/8"x1 1/8".

**SHEETROCK Corner Bead No. 800**

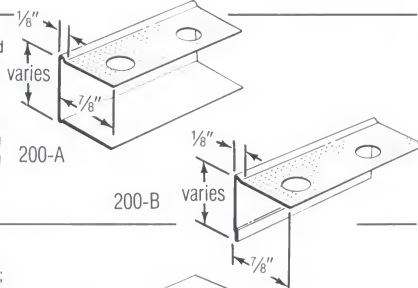
Galvanized steel external corner reinforcement with 1 1/4" wide fine-mesh expanded flanges. Nailed to framing through panels or stapled to panels. Provides superior key for joint compounds and eliminates shadowing and edge cracking.

**SHEETROCK Zinc Control Joint No. 093**

Relieves stresses of expansion and contraction across the joint in large ceiling and wall areas. Made from roll-formed zinc with a tape-protected 1/4" opening 7/16" deep. Lengths: 8' and 10'. Limitation: where sound and/or fire ratings are prime considerations, an adequate seal must be provided behind the control joint.

**SHEETROCK Metal Trims**

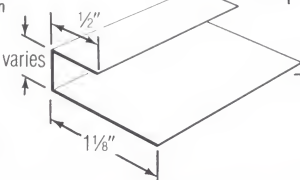
Provide protection and neat finished edges to gypsum panels at window and door jambs, ceiling angles and intersections where panels abut other materials. Nailed through the channel and panels into the framing or jamb. Eliminate precision cutting and mitering. Finished with joint compounds (except #400). Made in following types:

**#200 series**

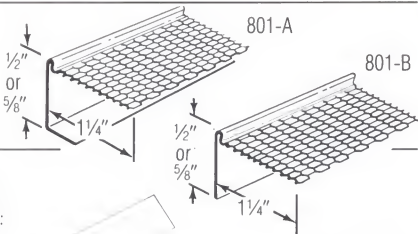
Steel casing, includes No. 200-A J-shaped channel in 1/2" and 5/8" sizes; No. 200-B L-shaped angle edge trim without back flange to simplify application, in 1/2" and 5/8" sizes.

#400 series

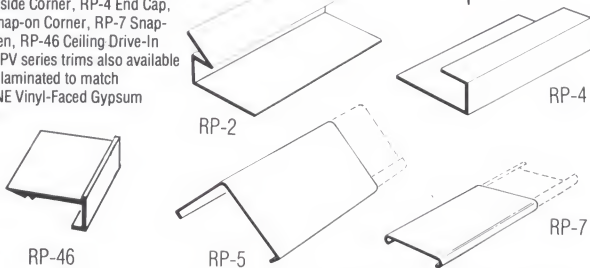
Reveal type trim, requires no finishing compound, includes No. 400 in 5/8" size, No. 401 in 1/2", No. 402 in 3/8" size.

**#800 series**

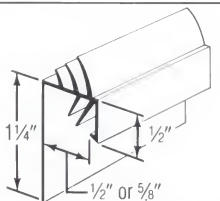
Expanded-flange trim used to provide edge protection at cased openings and ceilings or wall intersections. Includes 801-A J-shaped and 801-B L-shaped trim, both in 1/2" and 5/8" sizes.

**USG Rigid Vinyl Trim (RP Series)**

Vinyl plastic in Almond and Ash Blue. Available for 1/2" and 5/8" thick panels; lengths: 8', 9', 10'; shapes: RP-2 Inside Corner, RP-4 End Cap, RP-5 Snap-on Corner, RP-7 Snap-on Batten, RP-46 Ceiling Drive-In Trim. RPV series trims also available factory-laminated to match TEXTONE Vinyl-Faced Gypsum Panels.

**USG P-1 Vinyl Trim**

Reveal type, white plastic trim with flanges and web of rigid vinyl and integral flexible vinyl fins that compress on installation. Fins form permanent flexible seal to effectively block sound, replace caulking, provide structural stress relief at panel perimeter. Requires no finishing compound; includes P-1A in 1/2" size, P-1B in 5/8" size.

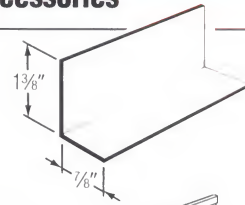


*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

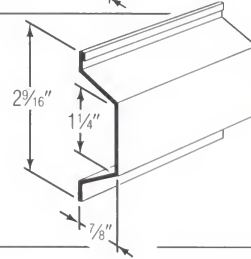
Framing and Furring Accessories*

UNIMAST Metal Angles

1 3/8"x7/8" corrosion-resistant steel angle sections used as runners to secure and brace 1" coreboard in laminated gypsum partitions. 2 1/2" x 2 1/2" size made for High-Attenuation Double Wall Systems. Length: 10'.

**UNIMAST Metal Furring Channels**

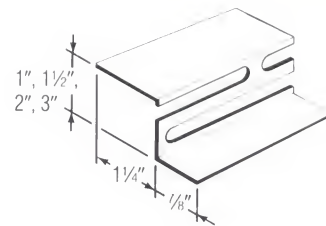
Hat-shaped channels for ceiling and wall furring. Roll-formed from two gauges of corrosion-resistant steel. DWG-25 for screw attachment of 1/2" and 5/8" gypsum panels. DWG-20 for greater spans and load-carrying capacity in ceiling applications. Products comply with ASTM C645. Face width: 1 1/4", depth: 7/8"; length: 12'.

**UNIMAST Metal Furring Channel Clips**

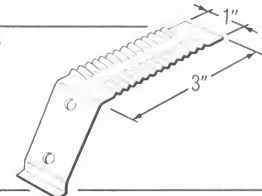
Made of galvanized wire for attaching DWG-25 Metal Furring Channels to 1 1/2" cold rolled channels. Installed on alternate sides of carrying channels; where clips cannot be alternated, wire tying recommended.

**SHEETROCK Z-Furring Channels**

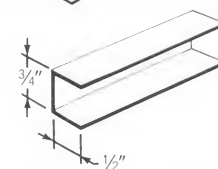
Mechanically attach THERMAFIBER, mineral and rigid foam insulations and SHEETROCK brand Gypsum Panels to interior surfaces of monolithic concrete and masonry walls. Also for attaching insulation and gypsum panels to interiors of existing walls and ceilings. Made of corrosion-resistant steel; furring depths: 1", 1 1/2", 2", 3"; length: 8'6".

**UNIMAST Adjustable Wall Furring Brackets**

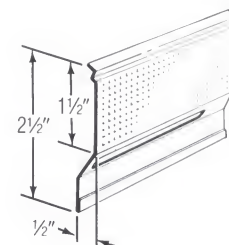
Used in braced furring systems for exterior masonry walls. 20-ga. corrosion-resistant steel with corrugated edges. Screw-attached to steel studs. Fur out panels up to 2 1/4" plus stud width.

**UNIMAST Cold-Rolled Channels**

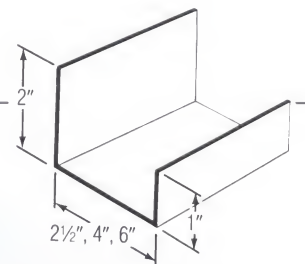
Made of 16-ga. steel, used for furring and in suspended ceilings and partitions. Available either galvanized or black asphaltum painted. Sizes: 3/4", with 1/2" flange; 1 1/2" and 2" with 1 1/2" flange. Length: 16' and 20'.

**RC-1™ Resilient Channel**

Part of the family of SHEETROCK Metal Products. Corrosion-resistant steel channel for resilient attachment of gypsum panels to wood and steel framing. Reduces sound transmission through wood and steel framed partition and floor-ceiling assemblies. Width: 2 1/2"; depth: 1/2"; length: 12'. Limitation: not for use beneath highly flexible floor joists; should be attached to walls or ceilings with 1 1/4" coarse thread or drywall steel screws; not suitable for use with more than 2 layers 5/8" thick gypsum panels.

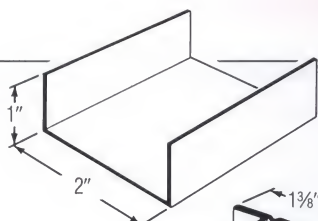
**USG Steel J-Runners**

Used at floor and ceiling in shaft wall assemblies and for special stud framing, made with unequal legs in 2 1/2", 4" and 6" widths; styles: 212JR24, 212JR20, 400JR24, 400JR20, 600JR24, 600JR20; length: 10'.



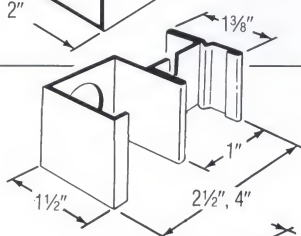
USG Steel CR-Runners

For solid area separation walls: 2" width, style 200CR25, 10' length.



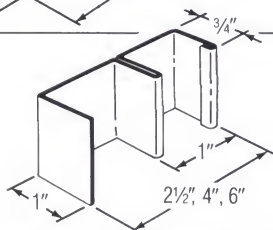
USG Steel C-H Studs

Rigid, roll-formed sections for cavity shaft walls shaped to engage 1" liner panels. Widths: 2½", 4" and 6"; styles: 212CH25, 212CH22, 212CH20, 400CH25, 400CH20, 212CH-L, 400CH-L; lengths as required.



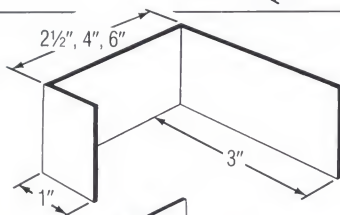
USG Steel E-Studs

Used singly for cavity shaft walls to cap partition or both sides of closure panel; widths: 2½", 4" and 6"; styles: 212ES25, 212ES20, 400ES25, 400ES20, 600ES25, 600ES20; lengths as required.



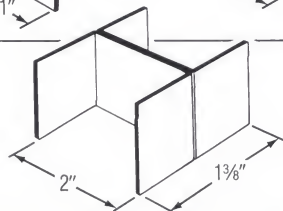
USG Steel Jamb Struts

Used in jamb framing for fire-rated shaft wall elevator door frames. Widths: 2½", 4" and 6"; style: 212JS20, 400JS20, 600JS20, length: 10'.



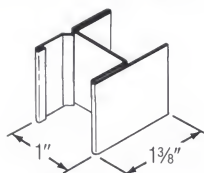
USG Steel H-Studs

Slide over and engage edges of adjacent liner panels for solid area separation walls. Width: 2"; style: 200HS25; length: 8' to 16'.



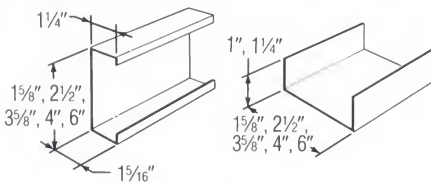
USG H-Spline

Roll-formed from 20-ga. steel for high-performance drywall partition systems. Slides over and engages edges of adjacent 1" gypsum liner panels. Width: 1"; style: 100HS20; length: 8' to 12'.



UNIMAST Steel ST-Studs and CR-Runners

Channel-shaped, roll-formed, with corrosion-resistant coating. Stud widths: 1½" (for ST25 only), 2½", 3½", 4", 6"; stud styles: ST25, ST22, ST20. Stud lengths: 8' to 16'. Runners come in stud widths, 10' length only.



Screws

SUPER-TITE Screws are high quality, economical screws for interior framing applications. These self-drilling, self-tapping steel screws have specially designed drill point and threads to assure fast penetration into steel and wood framing. Meet ASTM C1002. Sizes available: 1", 1½", 1¾", 1⅝", 2", 2¼", 2½", 3" Bugle Head for attaching gypsum panels to 20 and 25-ga. steel framing; 1¼" W Bugle Head for attaching panels to wood framing; ⅞" Pan Head Screws for securing 20 and 25-ga. studs to runners. **SUPER-TITE II Screws**, having alternate high and low threads, are available in the same sizes as SUPER-TITE Bugle Head Screws. **SUPER-TITE DRILLERS Screws** have sharp drilling flutes capable of penetrating 14-ga. steel. Meet ASTM C954. Self-drilling Bugle Head Screws in 1", 1½", 1¾", 1⅝", 1⅞", 2⅜", 2⅝" and 3" sizes are used for attaching gypsum panels to steel framing up to 14-ga. DRILLERS also come in ⅞" Pan Head Screw for anchoring up to 14-ga. studs to runners. **Buildex Screws** are aimed at producing the best possible attachments of SHEETROCK brand Gypsum Panels. Their development not only has improved installation methods but has made possible today's broad selection of drywall systems applied over steel framing. Screws must be used with such systems. Type S meets ASTM C1002; Type S-12 meets ASTM C954.

Insulation

THERMAFIBER Insulation is a mineral fiber product ideal for improving sound control in partition and floor-ceiling constructions. **Sound Attenuation Fire Blankets (SAFB)** are a paperless, semi-rigid mineral fiber mat designed to improve STC ratings when installed in steel stud partitions and wood-frame construction. Fire-resistant **Fire Safety FS-15 Blankets** are used to provide noncombustible exterior wall furring and steel stud curtain wall assemblies. They are open-faced and require separate vapor retarder (see Folder SA-707).

Adhesives and Acoustical Sealant

Drywall Adhesives make an important contribution to gypsum panel attachment where the finest room interiors are desired. Their use greatly reduces the nail or screw fastening otherwise required, thus saves labor on spotting and sanding—also minimizes nail pops and other fastener imperfections.

Recommended for laminating gypsum panels in multi-layer fire-rated or non-rated partitions and ceilings are **SHEETROCK Setting-Type Joint Compounds**—dry powder products, applied by spreader, requiring mixing and temporary fastening in application or **SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed**. These compounds provide tight bond when dry yet permit adjustment of panels after contact.

Recommended adhesives for non-fire-rated construction are a solvent-based stud adhesive which meets ASTM C557 or a rubber-based construction adhesive for subfloors and plywood construction which meets ASTM C557 and American Plywood Association Performance Standard AFG-01. Laminating and liquid contact adhesives are also commercially available. These adhesives bridge minor irregularities in the base or framing, make it easier to form true joints and level surfaces. The use of adhesive adds strength to an assembly, reduces fasteners required, helps eliminate loose panels and nail pops.

SHEETROCK Acoustical Sealant is a highly elastic, water-base caulking for sound-rated partition and ceiling systems and sealing exterior walls to reduce infiltration. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence to most surfaces, permanent flexibility and lasting seal. Flame spread 5, smoke developed 0. Meets ASTM C557 requirements, complies with ASTM C919.



Screws from Unimast Incorporated

Fastening Application	Fastener Used
Gypsum Panels to Steel Framing⁽¹⁾	
Attaches 1/2" and 5/8" single layer panels to steel studs, runners, channels.	1" SUPER-TITE
Attaches 5/8" gypsum panels to resilient channels or other steel framing.	1 1/8" SUPER-TITE
Attaches 1" coreboard to steel runners and metal angle runners in solid partitions. Resilient channels to wood framing.	1 1/4" SUPER-TITE
Attaches 1/2" and 5/8" double layer panels to steel studs, runners, channels.	1 5/8" SUPER-TITE
Attaches multiple layers of gypsum panels and other compatible materials to steel framing.	2" SUPER-TITE (2 1/4", 2 1/2" and 3" also available)
	(Buildex Type S, Bugle Head, available in 1", 1 1/4", 1 1/8", 1 5/8", 1 7/8", 2", 2 3/8", 2 5/8", 3")
Gypsum Panels to Steel Framing (20 gauge and heavier)	
1/2" and 5/8" panels and gypsum sheathing to steel studs and runners up to 14 gauge. Specify corrosion-resistant screws to attach gypsum sheathing in curtain walls. Use 1 5/8" and longer for multi-layer gypsum board applications.	1" SUPER-TITE DRILLERS (1 1/8", 1 1/4", 1 5/8", 1 7/8", 2 3/8", 2 5/8", 3" also available)
	(Buildex Type S-12, Bugle Head, available in 1", 1 1/4", 1 5/8", 1 7/8", 2", 2 3/8", 2 5/8", 3")
Self-furring metal lath and brick wall ties through gypsum sheathing to steel studs and runners in curtain walls. Specify corrosion-resistant for exterior applications.	1 1/4" Buildex Type S-12, Pancake Head
Metal lath to steel framing up to 14 gauge.	1 1/4" SUPER-TITE Modified Truss Head-Zinc Coated (1/2", 3/4" and 1" also available)
Steel Studs to Door Frames, Runners	
Steel studs to runners and resilient channels to 25-ga. steel studs.	7/16" SUPER-TITE Pan Framing-Special Framer (Buildex 3/8" Type S Pan Head available)
Steel studs to door frame jamb anchor clips. Steel studs to runners. Other metal to metal attachment up to 14 gauge.	7/16" SUPER-TITE DRILLER Pan Head (1/2" and 5/8" also available)
	(Buildex 3/8" and 1/2" Type S-12, Pan Head and 1/2" Type S-12, Low-Profile Head available for up to 12 gauge.)
Steel to steel connections up to double thickness 12 gauge.	Buildex 3/4" TRAXX/3 Hex Washer head—zinc coated (1/4"—14 x 3/4")
	(SUPER-TITE Hex Washer Head—zinc coated available in 1/2", 5/8", 3/4"—8 and 14 wire—and 1" for up to double thickness 14 gauge)

(1) Includes steel studs and runners, 25 to 20-ga; metal angles; metal furring channels; resilient channels. If channel resiliency makes screw penetration difficult, use screws 1/8" longer than shown to attach panels to resilient channels. For 25 to 20 ga. steel framing, use SUPER-TITE or Buildex Type S Screws; for 20 to 12 ga. use SUPER-TITE DRILLERS or Buildex Type S-12 Screws. For steel applications not shown, select a screw length at least 3/8" longer than total thickness of materials to be fastened.

Fastening Application	Fastener Used
Trim and Accessories to Steel Framing	
Cabinets to steel studs and RC-1 Resilient Channels.	Buildex 1 1/4" Type S, Oval Head (1 5/8", 2 1/4", 2 7/8" and 3 3/4" also available)
Gypsum Panels to Wood Framing	
3/8", 1/2" and 5/8" single layer panels to wood framing. RC-1 Resilient Channels to wood framing.	1 1/4" SUPER-TITE Type W Coarse Thread (1", 1 1/8", 1 5/8", 2", 2 1/4", 2 1/2", 3" also available)
	(1 1/4" Buildex Type W available)
Gypsum Panels to Gypsum Panels	
Multi-layer adhesively laminated gypsum to gypsum partitions (not recommended for double layer 3/8" panels).	1 1/2" SUPER-TITE Laminating (1 1/2" Buildex Type G, Bugle Head available)
Wood Trim to Interior Steel Framing	
Wood trim over single-layer panels to steel studs, runners.	1 5/8" SUPER-TITE Phillips Trim Head (SUPER-TITE Square Head also available)
Wood trim over double-layer panels to steel studs, runners.	2 1/4" SUPER-TITE Phillips Trim Head (SUPER-TITE Square Head also available)
	(2 1/4" Buildex Type S Trim Head available)
Plywood to Steel Joist	
3/8", 1/2", 5/8" or 3/4", plywood to joists (penetrates double thickness 14 gauge).	1 5/16" Buildex Type S-12 Bugle Head, Pilot Point
Cement Board to Wood Framing	
For DUROCK Interior Cement Board and DUROCK Exterior Cement Board to wood framing. Wood trim over single-layer panels to steel studs, runners. With anti-corrosive coating.	1 1/4", 1 5/8" DUROCK Wood Screw 2 1/4" DUROCK Wood Screw
For DUROCK Exterior Cement Board applied over approved 1/2" rigid foam insulation to exterior wood framing. With anti-corrosive coating.	
Cement Board to Steel Framing	
For DUROCK Interior Cement Board and DUROCK Exterior Cement Board to steel framing (20-12 ga.). With anti-corrosive coating.	1 1/4" DUROCK Steel Screw 1 5/8" DUROCK Steel Screw
For DUROCK Exterior Cement Board and DUROCK Interior Cement Board applied over approved 1/2" rigid foam insulation to steel framing (20-12 ga.). With anti-corrosive coating.	

Joint Treatment and Texture Products

Today's complete United States Gypsum Company joint treatment line includes both ready-mixed and powder products in drying and hardening types. All are formulated without asbestos to meet OSHA and Consumer Product Safety standards pertaining to asbestos. In addition to conventional joint finishing and fastener spotting, certain of these products are designed for repairing cracks, patching, spackling, back-blocking, texturing and for laminating gypsum panels in double-layer systems. These products meet ASTM C475.

United States Gypsum Company also produces the industry's broadest line of texture finishes to provide distinctive appearance and surface decoration to gypsum panel walls and ceilings. A full line of both ready-to-use and powder products is offered to create fine, medium or coarse textures, sand or simulated acoustical finishes and interesting flat ripple, "orange peel" or light to medium stipples. For available texture products, often applied by the same trade which finishes gypsum drywall, refer to Texture and Finish Products Folder SA-933.

Also available is SHEETROCK First Coat, a superior, latex prime coat that equalizes surface absorption and texture differences of finished drywall to enhance the look and durability of any topcoat.

General Limitations

- 1 United States Gypsum Company joint compounds are not compatible with and should not be intermixed with any other compounds.
- 2 For interior use only (except SHEETROCK Setting-Type and Lightweight Setting-Type Joint Compounds); not recommended for laminating (except SHEETROCK Setting-Type and Lightweight Setting-Type Joint Compounds and SHEETROCK All Purpose and Taping Joint Compounds Ready-Mixed).
- 3 Protect bagged and cartoned products against wetting; protect ready-mixed products from freezing and extreme heat.
- 4 Each compound coat must be dry before the next is applied (except SHEETROCK Setting-Type and Lightweight Setting-Type Joint Compounds), and completed joint treatment must be thoroughly dry before decorating.
- 5 Only SHEETROCK Setting-Type and Lightweight Setting-Type Joint Compounds are recommended for treating joints of SHEETROCK brand Gypsum Panels, Water-Resistant, to be covered with ceramic or plastic tile (do not use other compounds).

SHEETROCK Joint Tape is a strong, cross-fibered paper tape with minimal longitudinal stretch and superior tensile strength. Lightly pre-creased for corner application. For estimating purposes: for 1,000 sq. ft. of surface area to be finished, approximately 370 lin. ft. of tape and 83 lb. of drying-type powders, 72 lb. of setting-type powders, 52 lb. of lightweight setting-type powders, 138 lb. of ready-mixed type or 9.4 gallons of SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) are required.

Ready-Mixed Compounds

SHEETROCK Ready-Mixed Joint Compounds are vastly superior to ordinary ready-mixed compounds and are preferred for consistently high-quality work. These non-asbestos, vinyl-based formulations are specially premixed to a creamy, smooth consistency essentially free of crater-causing air bubbles. They offer excellent slip and bond, easy workability. Used direct from the container without mixing, thinning or retempering. Joint finishing is fast, easy and smooth, reducing labor costs and improving appearance and quality of the job. **Limitation:** protect wet joints and container from freezing.

SHEETROCK Taping Joint Compound Ready-Mixed is a high-performance product for embedding tape and as a first fill coat over metal bead, trim and fasteners. Also used for laminating.

SHEETROCK Topping Joint Compound Ready-Mixed is a low-shrinkage, easily applied and sanded product recommended for second and third coats over ready-mixed taping and all purpose compounds. Also used for simple texturing or skim coating. Not suitable for embedding tape or as first coat over metal corners, trim and fasteners.

SHEETROCK All Purpose Joint Compound Ready-Mixed is used for embedding, finishing, simple texturing, laminating and skim coating. Combines single-package convenience with good taping and topping characteristics. Recommended for repairing cracks in interior plaster and masonry not subject to moisture.

SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) offers all benefits of a conventional product. Exclusive advantages: weighs up to 35% less, requires only two coats over metal trim and fasteners, gives exceptional ease of sanding. This all-purpose, single-package product provides tight bond, superior slip and workability, good crack resistance and low shrinkage. Also used for simple texturing.

Vinyl-Base Powder Joint Compounds

SHEETROCK Powder Joint Compounds are top-quality, non-asbestos, conventionally drying products providing easy mixing, smooth application and ample working time. Designed for embedding tape; for fill coats and finishing over drywall joints, corner bead, trim and fasteners. Also used for simple texture finishes for decorating variety; will not cause alkali burning of paint.

SHEETROCK Taping Joint Compound is designed for embedding tape and for first fill coat on metal beads, trim and fasteners; also used for patching plaster cracks. Outstanding bond and resistance to tape cracking.

SHEETROCK Topping Joint Compound is a smooth-sanding material for second and third coats over taping compound or all-purpose compound. Produces excellent feathering and superior finishing results.

SHEETROCK All Purpose Joint Compound incorporates good taping and topping characteristics in a single product. For use where finest results of the specialized compounds (above) are not necessary. Also has good texturing properties.

SHEETROCK Setting-Type (DURABOND®) and Lightweight Setting-Type (EASY SAND™) Joint Compounds

These setting-type powder products were developed to provide faster finishing of drywall interiors, even under slow drying conditions. Rapid chemical hardening and low shrinkage permit same-day finishing and usually next-day decoration. Features exceptional bond; virtually unaffected by humidity extremes. Ideal for laminating double-layer systems, particularly fire-rated assemblies, and for adhering gypsum panels to above-grade concrete surfaces. May be used for skim coating and surface texturing and for filling, smoothing and finishing interior above-grade concrete. Also used to treat joints in exterior gypsum ceiling board and (except for SHEETROCK Lightweight Setting-Type Joint Compound) to embed tape and fill beads in veneer finish systems when rapid drying conditions exist. **Limitations:** SHEETROCK Setting-Type Type Joint Compounds (DURABOND) are difficult to sand after drying and must be smoothed before complete setting. Not to be applied over moist surfaces or surfaces likely to become moist, on below-grade surfaces, or on surfaces subject to moisture exposure, pitting or popping.

SHEETROCK 210 Setting-Type Joint Compound is preferred for embedding tape and metal accessories; also ideal for heavy fills because it chemically hardens in 3 to 4 hours. Virtually unaffected by humidity.

SHEETROCK 90 Setting-Type Joint Compound with an 85 to 130 min.

setting time is an ideal alternate to SHEETROCK 210 Setting-Type Joint Compound in applications where quicker finishing or laminating are desired. Required as prefill material for SHEETROCK brand Gypsum Panels, SW Edge. Recommended for filling joints of SHEETROCK brand Gypsum Panels, Water-Resistant, and treating fastener heads in areas to receive ceramic or plastic tile. Also used extensively for touch-up and patching; ideal for filling offsets and voids in poured concrete.

SHEETROCK 20, 45 and 300 Setting-Type Joint Compounds offer varied setting times of 20 to 30 min., 30 to 80 min., and 240 to 360 min.

SHEETROCK Lightweight Setting-Type Joint Compound (EASY SAND) weighs 25% less than conventional setting-type compounds for easier handling, faster application and improved productivity on the job. Provides sanding ease similar to a ready-mixed, all purpose joint compound. Offers varied setting times of 20 to 30 min., 30 to 80 min., 85 to 130 min., 180 to 240 min. and 240 to 360 min.

Concrete Finishing Compound

COVER COAT Compound is a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise); on ceiling areas below grade; on surfaces which project outside the building, or on other areas which might be subject to moisture, freezing, efflorescence, pitting or popping.

Wood Framing Requirements

Wood framing meeting these minimum requirements is necessary for proper performance of these gypsum panel assemblies.

- 1 Framework should meet the minimum requirements of local building codes.
- 2 Framing members should be straight, true, of uniform dimension, and framing should be properly aligned.
- 3 All framing lumber should be of a good grade for the intended use, and 2"x4" nominal size or larger should bear the grade mark of a recognized inspection agency.
- 4 All framing lumber should have a moisture content not in excess of 15% at time of gypsum panel application.
- 5 Do not attach panels to extremely soft framing members.

Failure to observe these minimum framing requirements, which are applicable to screw, nail and adhesive attachment, will materially increase the possibility of fastener failure and surface distortion, due to warping or dimensional changes. This is particularly true if framing lumber has greater than normal tendencies to warp or shrink after erection.

Heating and Ventilation Recommendations

Framing should approach as closely as possible the moisture content it will reach in service by allowing the building, after it is enclosed, to stand as long as possible prior to the application of the gypsum panels. Provide heat in winter or during damp conditions at a uniform temperature in the range of 55° to 70°F. Provide ventilation to remove excess moisture.

Good Design Practices

- 1 **Specifications**—The following comments and recommendations cover basic specifications for normal job requirements and are intended as minimum guide specifications which can be adapted to specific projects and conditions. These specifications are not intended to cover every possible design or job condition, but rather to assist in preparation of specifications.

- 2 **Related Systems**—Description, details and specifications on various systems are covered in these pertinent USG Corporation folders:

SA-700 Durock Exterior Cement Board Systems
SA-707 THERMAFIBER Life-Safety Insulation Systems
SA-921 USG High-Attenuation Resilient/Steel Framed Systems
SA-922 USG High-Attenuation Double Wall Systems
SA-923 Drywall/Steel Framed Systems
SA-924 Drywall/Wood Framed Systems
SA-925 USG Area Separation Wall Systems
SA-926 USG Cavity Shaft Wall Systems
SA-932 Durock Interior Cement Board Systems
SA-933 Texture and Finish Products

- 3 **Protection**—Light gauge metal components such as steel studs and runners, furring channels and resilient channels should be given adequate protection in the warehouse and on the jobsite against rusting caused by moisture. In marine areas such as the Caribbean, Florida and the Gulf Coast where chloride as well as sea salt is present in combination with excessively high humidity, use of components which offer increased protection against corrosion is recommended.

- 4 **Shadowing and Spotting**—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing and spotting may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

- A The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c.
- B On exterior masonry walls, install rigid or semi-rigid insulation between SHEETROCK Z-Furring Channels affixed to interior side of wall and finish with SHEETROCK brand Gypsum Panels, Foil-Back.
- C For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior wall.

- 5 **Painting Systems**—For satisfactory results, painting products and systems should be used which comply with recommendations and requirements in Appendixes of ASTM C840.

For priming and decorating with paint, texture or wall covering, follow manufacturer's directions for materials used. All surfaces, including applied joint compound, must be thoroughly dry, dust-free, and not glossy. Prime with SHEETROCK First Coat or with an undiluted, interior latex flat paint with high-solid content. Allow to dry before decorating.

To improve fastener concealment, where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and be decorated with a gloss paint (egg shell, semi-gloss or gloss), the gypsum panel surface should be skim coated with joint compound to equalize suction before painting.

- 6 **Note**—United States Gypsum Company reserves the right to make changes or improvements in the design of all catalogued items without notice and without obligation to incorporate these changes or improvements in items already manufactured.
- 7 **Additional Information**—See United States Gypsum Company technical folders in this series and in Sweet's General Building File. See UN-30 UNIMAST Steel Framing Systems: Technical Information for data on steel products.

Part 1: General

1. Scope—Specify to meet project requirements.

1.2 Qualifications

All material described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed directions.

All studs, runners and other accessories identified as UNIMAST products in this catalog are exclusively marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

A Gypsum Panels (in lengths as long as practical to minimize number of joints):

SHEETROCK brand (Regular, SW Edge, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).

SHEETROCK brand Foil-Back (Regular, SW Edge, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).

SHEETROCK brand Water-Resistant (Regular, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).

TEXTONE Vinyl-Faced Gypsum Panels (type) (pattern) (thickness).

B Gypsum Coreboard: SHEETROCK brand Coreboard (length).

C Gypsum Sheathing: (SHEETROCK brand Gypsum Sheathing, GYP-LAP Gypsum Sheathing) (FIRECODE) (size) (thickness.)

D Exterior Ceiling Board: SHEETROCK brand Exterior Gypsum Ceiling Board (thickness).

E Interior Ceiling Board: SHEETROCK brand Interior Gypsum Ceiling Board (length).

F Insulation: THERMAFIBER Sound Attenuation Fire Blankets (thickness)(width). THERMAFIBER Commercial Insulation Blankets (thickness)(width).

G Interior Steel Studs and Runners

UNIMAST Steel Studs: 158ST25 (1 $\frac{5}{8}$ "), 212ST25 (2 $\frac{1}{2}$ "), 358ST25 (3 $\frac{5}{8}$ "), 400ST25 (4"), 600ST25 (6"), 212ST22 (2 $\frac{1}{2}$ "), 358ST22 (3 $\frac{5}{8}$ "), 400ST22 (4"), 600ST22 (6"), 212ST20 (2 $\frac{1}{2}$ "), 358ST20 (3 $\frac{5}{8}$ "), 400ST20 (4"), 600ST20 (6"), 362SJ20 (3 $\frac{5}{8}$ "), 40SJ20 (4").

UNIMAST Steel Runners: 158CR25 (1 $\frac{5}{8}$ "), 212CR25 (2 $\frac{1}{2}$ "), 358CR25 (3 $\frac{5}{8}$ "), 400CR25 (4"), 600CR25 (6"), 212CR22 (2 $\frac{1}{2}$ "), 358CR22 (3 $\frac{5}{8}$ "), 400CR22 (4"), 600CR22 (6"), 362CR20 (3 $\frac{5}{8}$ "), 400CR20 (4").

H Exterior Steel Studs and Runners

UNIMAST ST Style Studs: 212ST20 (2 $\frac{1}{2}$ "), 358ST20 (3 $\frac{5}{8}$ "), 400ST20 (4"), 600ST20 (6").

Note: Select CR20 Runner to match stud style.

UNIMAST SJ Style Studs: 362SJ20 (3 $\frac{5}{8}$ "), 362SJ18 (3 $\frac{5}{8}$ "), 362SJ16

(3 $\frac{5}{8}$ "), 362SJ14 (3 $\frac{5}{8}$ "), 40SJ20 (4"), 40SJ18 (4"), 40SJ16 (4"), 40SJ14 (4"), 60SJ20 (6"), 60SJ18 (6"), 60SJ16 (6"), 60SJ14 (6"), 725SJ18 (7 $\frac{1}{4}$ "), 725SJ16 (7 $\frac{1}{4}$ "), 725SJ14 (7 $\frac{1}{4}$ "), 80SJ18 (8"), 80SJ16 (8"), 80SJ14 (8").

UNIMAST Runners: Select CR-runner to match stud style. CR18 styles may be used with SJ16 and SJ14 studs.

I Metal Furring Materials: (UNIMAST Metal Furring Channels and Clips) (UNIMAST Adjustable Wall Furring Brackets) (UNIMAST Cold-Rolled Channels $\frac{3}{4}$ " or 1 $\frac{1}{2}$ ") (SHEETROCK Z-Furring Channels).

J Corner Angles: UNIMAST Metal Angles, 2 $\frac{1}{2}$ "x2 $\frac{1}{2}$ "x24 ga. corrosion-resistant steel, lengths as required.

K Corner Reinforcement: (DUR-A-BEAD Corner Bead No. 103, 104) (SHEETROCK No. 800).

L Metal Trim: SHEETROCK Metal Trim No. (200-A $\frac{1}{2}$ " or $\frac{5}{8}$ " , 200-B $\frac{1}{2}$ " or $\frac{5}{8}$ " , 400, 401 or 402, 801-A $\frac{1}{2}$ " or $\frac{5}{8}$ " , 801-B $\frac{1}{2}$ " or $\frac{5}{8}$ ").

M Plastic Trim: USG (P-1) (RP Series), Vinyl Trim.

N Resilient Channels: RC-1™ Resilient Channel.

O Control Joint: SHEETROCK Zinc Control Joint No. 093.

P USG H-Spline Wall Systems: USG H-Splines, SHEETROCK brand Gypsum Liner Panels.

Q Drywall Screws:

size: ($\frac{3}{8}$ ")(7 $\frac{1}{16}$ ")($\frac{1}{2}$ ")(1")(1 $\frac{1}{4}$ ")(1 $\frac{1}{2}$ ")(1 $\frac{5}{8}$ ")(2")(2 $\frac{1}{4}$ ")(2 $\frac{1}{2}$ ")(3")
style: (framing—Type S or S-12)(drywall—Type S) (self-drilling—Type S-12)(laminating—Type G) (coarse thread—Type W)

head: (bugle)(pan)(trim)(pancake)(low-profile) (mod. truss head)

coating: (reg)(corrosion-resistant)

R Drywall Nails: (length) (type) (USG Matching Color Nails to match finish of TEXTONE Vinyl-Faced Gypsum Panels) (conforming with "Recommended Performance Standards for Nails for Gypsum Wallboard", adopted by Gypsum Association and the AWCI) (as specified in fire-resistive construction.)

S Drywall Adhesives: (SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound 210 or 90.) (SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed).

T Joint Treatment: SHEETROCK Joint Tape. SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound (20, 45, 90, 210, 300). SHEETROCK Joint Compound (Taping, Topping, All Purpose). SHEETROCK Ready-Mixed Joint Compound (Taping, Topping, All Purpose). SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3).

U Prime Coat: SHEETROCK First Coat.

V Caulking: SHEETROCK Acoustical Sealant.

W Concrete Finishing Compound: (SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound) (COVER COAT Compound) (as ready-mixed) (with sand additive).

X Cavity Shaft Wall Materials: SHEETROCK brand Gypsum Liner Panels, USG Steel J-Runners (style), USG Steel C-H Studs (style), USG Steel E-Studs (style), USG Steel Jamb Struts (style).

Y Cavity-Type Area Separation Wall Materials: SHEETROCK brand Gypsum Liner Panels, USG Steel CR-Runners (style), USG Steel C-H Studs and E-Studs (style), USG Aluminum Breakaway Clip.

Z Solid-Type Area Separation Wall Materials: SHEETROCK brand Gypsum Liner Panels, USG Steel CR-Runners (style), USG Steel H-Studs (style), USG Aluminum Breakaway Clip.

Part 3: Execution

3.1 Gypsum Panel Application

3.1.1 Basic Single-Layer System, Treated Joints

- A** Position all ends and edges of all gypsum panels over framing members, except when joints are at right angles to framing members as in perpendicular application or when end joints are backblocked.
- B** Apply gypsum panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.
- C** Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive Application) (Double Nailing Method) (Power-driven Screws). Space fasteners not less than $\frac{3}{8}$ " from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.
- D** Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner.
- E** Install trim at all internal and external angles formed by the intersection of either panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions.

(Multi-layer systems: see pertinent United States Gypsum Company System Folders).

3.1.2 SHEETROCK brand Gypsum Panels, Water-Resistant—(see United States Gypsum Company Folder SA-924.)

3.1.3 Lamination of Gypsum Panels to Interior Monolithic Concrete and Unit Masonry

- A** The masonry or concrete shall be clean, smooth and dry prior to application. If wood base is to be used, attach wood nailer to wall before lamination is started.
- B** Cut face panels to allow continuous clearance ($\frac{1}{8}$ " to $\frac{1}{4}$ ") at floor. Apply SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound, or SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed at center and near each panel edge in strips consisting of 4 beads, $\frac{3}{8}$ " wide x $\frac{1}{2}$ " high and spaced $1\frac{1}{2}$ " to 2" o.c. Position panels vertically over wall surface, press into place and provide temporary support until adhesive is hardened.
- C** Install trim at all intersections of panel surfaces with other surfaces.
- D** Lamination to interiors below grade or directly to interior surfaces of exterior walls, and lamination where exposure to moisture is extreme or continuous, are not recommended.

3.2 RC-1™ Resilient Channel Erection

(See specifications in Systems Folders SA-921, SA-923 and SA-924)

3.3 Steel Stud and Runner Erection

(See specifications in Systems Folder SA-923).

3.4 Metal Furring Channel Erection

(See specifications in Systems Folder SA-923).

3.5 Control Joint Installation

Attach SHEETROCK Zinc Control Joint No. 093 with Bostitch $\frac{9}{16}$ " "G" staples or equal spaced not over 6" apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.6 Fastener and Adhesive Application

3.6.1 Drywall Screws

Power-drive with an electric screwdriver so screwheads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than $\frac{3}{8}$ " from edges and ends of gypsum panels.

3.6.2 Nails

Drive nails with heads slightly below gypsum panel surface in a uniform dimple $\frac{1}{32}$ " deep formed by crowned face of hammer. Drive nails no closer than $\frac{3}{8}$ " from edges and ends of panel.

3.6.3 Adhesive

Mix and apply in accordance with manufacturer's directions, and as follows:

- A** Apply SHEETROCK 90 or 210 Setting-Type or Lightweight Setting-Type Joint Compound in the prescribed manner to back of face panels to be laminated. Laminate face panels to (base layer panels) (coreboard) using moderate pressure and temporary nailing or shoring to insure adequate bond.
- B** Apply stud adhesive in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two gypsum panels meet on a framing member, apply two parallel beads on face of framing at panel joints. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following contact of panel to adhesive, apply necessary fasteners 16" o.c. around perimeter of panel, $\frac{3}{8}$ " away from edges and ends. On ceilings only, apply one temporary field fastener per framing member at mid-width of board; remove after 24 hours. With predecorated panels pre-bowed and applied vertically, use permanent fasteners only at top and bottom of panel.
- C** Apply laminating adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four $\frac{1}{4}$ "x $\frac{1}{4}$ " minimum notches spaced max. of 2" o.c. Position face panels against base panels; fasten at top and bottom (vertical application) as required. For laminated ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member installed at mid-width of panel. Press panel into place with firm pressure to insure bond; press again within 24 hr. if necessary.
- D** Apply liquid contact adhesive with a short nap paint roller to cover both contact surfaces according to adhesive manufacturer's directions. Let adhesive air dry to the touch. Apply panels as soon as possible after drying occurs. On walls, fasten 16" o.c. at top and bottom (vertical application) as required. In ceiling lamination, apply permanent supplementary fasteners at each corner of panel, and along edges spaced max. 48" o.c. Press panel into place with firm pressure to insure bond.
- E** Apply construction adhesive in continuous $\frac{3}{8}$ " beads to framing. On walls, apply a continuous adhesive bead to center of studs to within 6" of board perimeter. At panel joints, apply two adhesive beads—one at a time—as each panel is installed. Do not apply adhesive at inside corners or to top and bottom plates, bridging, bracing and fire stops. Apply no more adhesive than can be covered in 15 min. Set panel in place, fasten 16" o.c. along top and bottom of panel and impact by hand along stud.

3.7 Pre-Fill Application

- A** Mix SHEETROCK 90 Setting-Type or Lightweight Setting-Type Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.
- B** Pre-fill all "V"-grooves formed by abutting tapered eased edges of SHEETROCK brand Gypsum Panels, SW Edge, with SHEETROCK 90 Setting-Type or Lightweight Setting-Type Joint Compound using a flexible 5" or 6" joint finishing knife or Ames Pre-Fill Tool. Fill "V" joint flush and wipe off excess compound beyond the "V"

groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to the next application (tape or embedding coat).

3.8 Joint Treatment Application

- A** Mix joint compound in strict accordance with manufacturer's recommendations.
- B** Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply joint tape centered over joint and seated into compound. Sufficient compound—approx. $\frac{1}{64}$ " to $\frac{1}{32}$ "—must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: SHEETROCK Setting-Type and Lightweight Setting-Type Joint Compounds need only have hardened prior to application of next coat.)
- C** Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out at least 2" beyond first coat. On joints with no taper, cover the tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: SHEETROCK Setting-Type and Lightweight Setting-Type Joint Compounds need only have hardened prior to second coat application.)
- D** Spread finish coat evenly over and extend at least 2" beyond second coat on all joints and feather to a smooth uniform finish. Do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand lightly between coats and following the final application of compound to provide a smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.9 Finishing Fasteners

Apply a taping, all-purpose type or ready-mixed lightweight all-purpose compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the surface. (Exception: SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) needs only one additional coat.)

3.10 Finishing Beads and Trims

- A** Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat. (Exception: SHEETROCK Setting-Type and Lightweight Setting-Type Joint Compounds need only have hardened prior to application of next coat.)
- B** Apply second coat in same manner as first coat, extending compound slightly beyond onto face of panel. Compound must be thoroughly dry prior to application of finish coat.
- C** Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane or surface. (Exception: Only two coats of SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) are needed). Sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.11 Exterior Joint System Application

- A** Mix SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound according to directions on the bag. Do not overmix, nor use in temperatures below 45°F.
- B** Pre-fill joints of SHEETROCK brand Exterior Gypsum Ceiling Board with SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound. After pre-fill has hardened, embed SHEETROCK Joint Tape centered over joint. When compound has hardened, immediately apply fill coat.

- C** Apply SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound over flanges of SHEETROCK Zinc Control Joints, metal beads and trim. Spot fastener heads.

- D** After fill coat has hardened, apply finishing coat of SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound. Completely cover all joints, angles, beads, control joints and fasteners.

Note: After SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound has dried, apply one coat oil-based primer-sealer and one coat exterior oil or latex paint over entire surface.

3.12 Filling and Finishing Interior Concrete

- A** Concrete surfaces shall be clean, smooth, dry and free from contaminants and exposed metal protected with a rust-inhibitive primer and allowed to dry.
- B** Fill offsets and voids with a SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound.
- C** Mix (COVER COAT Compound) (SHEETROCK Setting-Type or Lightweight Setting-Type Joint Compound) according to manufacturer's directions and apply to concrete (ceilings) (columns) before interior partitions are erected. Coordinate application of SHEETROCK No. 800 Corner Bead on angles and corners as required, embedding and covering both flanges with a smooth fill of compound 3" to 4" wide. Apply sufficient coats to obtain a smooth surface. If SHEETROCK Setting-Type Joint Compound is used, and if an easier-sanding surface is desired, then apply a skim coat of COVER COAT Compound over entire surface. After compound has dried, sand to a smooth surface suitable for decoration.

Trademarks: The following trademarks used herein are owned by USG Corporation or a related company: USG, SHEETROCK, FIRECODE, TEXTONE, PLUS 3, DUROCK, THERMAFIBER, DUR-A-BEAD, EASY SAND, COVER COAT, RC-1, GYP-LAP, UNIMAST, DRILLERS and SUPER-TITE are trademarks of Unimast Incorporated. Type S, S-12 and TRAXX are trademarks of ITW Buildex.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Sales Offices: Arizona: Phoenix, (602)866-0795 • California: Fremont, (415)792-4400; Glendale, (818)956-1882 • Florida: Jacksonville, (904)764-3293; Miami (305)557-4501 • Georgia: Atlanta, (404)393-0770 • Hawaii: Honolulu, (808)538-7712 • Illinois: Chicago, (312)606-4130 • Indiana: Indianapolis, (317)848-1513 • Louisiana: New Orleans, (504)241-2020 • Maryland: Baltimore, (301)355-2200 • Massachusetts: Charlestown, (617)241-8530 • Michigan: Southfield, (313)569-1900 • Minnesota: Bloomington, (612)854-4233 • Missouri: St. Louis, (314)349-0980 • New York: Albany, (518)458-7437; Oakfield, (716)948-5287; Stony Point, (914)786-2820 • North Carolina: Charlotte, (704)552-7402 • Ohio: Chesterland, (216)729-1956 • Oregon: Beaverton, (503)626-8864 • Pennsylvania: Pittsburgh, (412)341-2434 • Tennessee: Nashville, (615)361-8419 • Texas: Dallas, (214)490-0771; Houston, (713)666-0751 • Utah: Salt Lake City, (801)266-4975 • Virginia: Richmond, (804)285-7528 • International Division: Chicago, (312)606-5831.

United States Gypsum Company
101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

TEXTONE Vinyl-Faced Gypsum Panels



Ready-Made Savings in a Wide Selection of Finishes

TEXTONE Vinyl-Faced Gypsum Panels and mouldings, together with conventional drywall accessories, provide economical and permanent partitions. The predecorated panels are available in 38 vinyl finishes that assure compatibility with today's fabrics, floor coverings and ceiling tiles. Patterns come in color groups coordinated to intermix harmoniously.

TEXTONE Vinyl-Faced Gypsum Panels offer faster room completion and lower in-place cost than field-applied vinyl when used with conventional drywall framing systems or in combination with the relocatable wall systems from USG Interiors (see Relocatable Wall Systems Folder SA-1020 in Sweet's General Building & Renovation or Facility Interiors and Renovation files, Section 10615). There's no mess—no joint compounds, no taping. No schedule delays either. The durable vinyl finish continues to look new with routine soapy water cleaning—reducing or eliminating redecorating costs.

Choice of Sizes, Standard and Custom

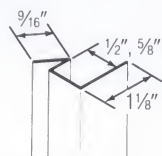
Panels are 1/2" thick, 4' wide and 8, 9 and 10' long. May be special ordered in 3/8" and 5/8" thicknesses, 2' widths and custom lengths from 6' to 14'.

For Fire-Rated Construction, Too

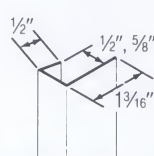
TEXTONE Vinyl-Faced Gypsum Panels are available with a special gypsum core for fire-rated construction. TEXTONE Regular and FIRECODE Core Panels meet ASTM C960. FIRECODE Core Panels come in 1/2" and 5/8" thicknesses, 4' wide.

Mouldings

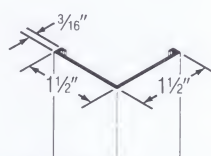
A complete line of surface mouldings provide the finishing touch on edges, corners and trim around openings. Mouldings are precision extruded from rigid plastic and are available plain (RP) in standard Almond or Ash Blue colors or factory laminated with matching TEXTONE Vinyl (RPV). Mouldings are easy to cut and mitre on the job. Included are: inside corner, end cap, snap-on corner, snap-on batten, ceiling/drive-in trim. For actual moulding samples, ask your United States Gypsum Company representative for Accessory Sample WB-1836.



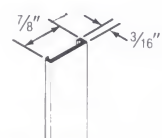
RP-2 RPV-2
Inside Corner



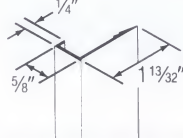
RP-4, RPV-4
End Cap



RP-5, RPV-5
Snap-On Corner



RP-7, RPV-7
Snap-On Batten



RP-46, RPV-46
Ceiling Drive-In Trim

Moulding Installation

Mouldings should be installed with appropriate drywall mechanical fasteners listed in Part 2: Products, Section 2.5 (Fasteners).

- **RP-2 and RPV-2 Inside Corner**—Install first panel so that vertical edge aligns with framing. Apply moulding over first panel, fastening exposed flange to framing. Insert opposite panel into moulding.
- **RP-4 and RPV-4 End Cap**—Align and fasten end cap to framing. Insert panel into moulding, apply panel to wall.
- **RP-5 and RPV-5 Snap-on Corner**—Apply panels using adhesive or adhesive/nail-on application. Place retainer strip over corner, fasten with nails or screws driven through holes provided and snap corner face onto retainer strip.
- **RP-7 and RPV-7 Snap-on Batten**—Apply panels using adhesive or adhesive/nail-on application. Place retainer strip over joint, fasten with nails or screws driven through holes provided and snap batten face onto retainer strip.
- **RP-46 and RPV-46 Ceiling Drive-in Trim**—Install after panels are applied. Insert grooved flange between runner and ceiling; tap trim into place. Adhesive may be required to secure trim.

Matching Wall Covering

Cotton sheet-backed TEXTONE Vinyl Wallcovering is available for field installation. Most wallcoverings weigh 1.2 to 1.4 oz./sq. yd. and come in 54" x 30 yd. rolls.

Panel surface burning characteristics and vapor permeance⁽¹⁾

TEXTONE Pattern	Film Thickness or Weight	Flame Spread	Smoke Dev.	Vapor Perm.
Pumice	6 mils	20	25	0.8
Suede	6 mils	15	25	0.6
Presidio	6 mils	15	25	0.6
Granite	6 mils	15	25	0.6
Woodgrain	6 mils	20	15	0.6
Linen	8 mils	15	25	0.5
Country Weave	10 mils	20	35	0.8
Textile (Type I, Fabric-Backed) ⁽²⁾	10.7 oz./yd ²	25	65	1.0
Brittany (Type I, Fabric-Backed) ⁽²⁾	10.0 oz./yd ²	25	55	2.1

(1) Tested in accordance with ASTM E84-80.

(2) Comply with Federal Specification CCC-2-408C, Type I.

Limitations

- 1 For adhesive application of TEXTONE Vinyl-Faced Gypsum Panels, only water-thinned adhesives are recommended. Other adhesives may not be compatible and could result in delamination and discoloration of vinyl surfaces.
- 2 If TEXTONE Vinyl-Faced Gypsum Panels, FIRECODE Core, are used in a fire-rated assembly instead of a non-vinyl-faced product such as SHEETROCK brand Gypsum Panels, FIRECODE Core, the applicable fire test must permit exposed joints or battens.
- 3 Not recommended for use over foil-back panels or other vapor retarder in exterior walls.
- 4 Avoid exposure to excessive or continuous moisture and extreme temperatures.
- 5 Do not apply on exterior walls in hot, humid climates without suitable vapor control or dry air circulation behind the panels.

Pumice

Range A



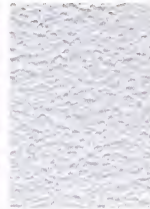
Pearl (66)



Vanilla (66)



Bright Beige (66)



Stone (68)

TEXTONE Vinyl-Faced Gypsum Panels are available in 38 vinyl finishes, factory-applied. For actual samples, see swatchbook WB-1835.

The vinyl finishes below are organized by price range, with Range A lowest and Range E highest. Average light reflectance values are in parenthesis after finish names.



Shell (73)



Bone (64)



Putty (38)



Clay Gray (36)



Satin Mauve (66)



Adobe (53)

Suede

Range B



Old Ivory (61)



Summer Shore (48)



White Frost (64)



Reed (78)



Linear (78)

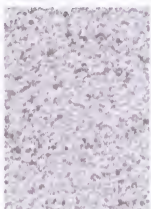


Island (78)



Zephyr (78)

Granite



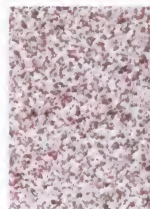
Chalk Blue (63)



Olive Stone (63)



Woodland (63)



Tapestry (63)



Natural Pecan (15)

Presidio

Woodgrain

Country Weave

Range C



Pewter (56)



Straw (56)



Champagne (60)



Basket (58)



Cream (58)



Beach (58)



Wicker (45)



Fog (42)

Textile

Range D



Scroll (71)



Chalk (50)



Mist White (63)

Brittany

Range E



Mauve (31)



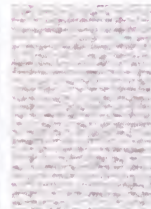
Bluebrook (44)



Natural (58)



Dove Gray (45)



Tahiti (44)

These photos show the actual vinyl laminated to gypsum panels. Slight color differences may exist between the printed colors shown and the actual product colors. Refer to swatchbook WB-1835 for vinyl samples.

Good Design Practices

- 1 For fire-rated assemblies**—refer to application requirements of the specific system tested. Mechanical fastening is usually required along with a specific type of adhesive.
- 2 Adhesives**—for more complete details and application using adhesives, see Gypsum Panels and Accessories Folder SA-927 in this series and manufacturer's directions.
- 3 Additional information**—refer to TEXTONE Vinyl-Faced Gypsum Panels Installation & Maintenance/Technical Data, WB-1330, and TEXTONE Decorative Mouldings, WB-1385.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and installed by workers experienced in this trade.

1.3 Delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental conditions

In cold weather the building shall be heated and ventilated during application of gypsum vinyl-faced panels to maintain temperature and ventilation consistent with good working conditions for finish work.

Part 2: Products

2.1 Gypsum vinyl-faced panels

TEXTONE (type)(pattern and color)(thickness and size)(core formulation).

2.2 Mouldings and trim

(type) TEXTONE Mouldings, (pattern and color)(thickness and size).

2.3 Adhesives

(SHEETROCK Setting Type Joint Compound-210 or 90)(SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed). Specify from Gypsum Panels and Accessories Folder, SA-927.

2.4 Fasteners

- A** Coordinated color nails (color)(length). Specify: 1 $\frac{1}{8}$ " for single layer, 1 $\frac{7}{8}$ " for double layer.
- B** Type S Screws (length). Specify: 1" for single layer, 1 $\frac{5}{8}$ " for double layer.
- C** Vinyl Foam Tape: 1 $\frac{1}{2}$ " wide min., $\frac{1}{32}$ " to $\frac{1}{16}$ " thick. Specify to eliminate mechanical fasteners or temporary bracing and for temporary attachment of adhesively applied panels until adhesive attains maximum bonding strength.

2.5 Fasteners (mouldings and trim)

- A** Screws—(1" Type S Bugle Head)(1 $\frac{1}{4}$ " Type W Bugle Head).
- B** Nails—obtain locally—($\frac{1}{2}$ " x 18 Flat-Head Wire)(1 $\frac{1}{4}$ " Annular Ring Drywall).

Part 3: Execution

3.1 TEXTONE Vinyl-Faced Gypsum Panels—wood or steel studs

Apply 8" long strip of vinyl foam tape to face of each stud, positioned at midpoint of studs up to 8' long, at third-points on studs up to 12' long and quarter-points on studs over 12'. Where no mechanical fasteners are to be used at top or bottom of stud, apply an 8" long strip of tape. Apply a continuous $\frac{3}{8}$ " bead of

drywall stud adhesive to the entire face of studs between vinyl foam tape. Immediately apply TEXTONE Vinyl-Faced Gypsum Panels vertically and apply sufficient pressure to insure complete contact with both tape and adhesive. Where use of color-matching TEXTONE nails is desired along ends and edges of board and in conjunction with drywall stud adhesive, drive nails with plastic-headed hammer or raw-hide mallet. Space nails at least $\frac{3}{8}$ " from ends and edges and 8" o.c.

3.2 TEXTONE Vinyl-Faced Gypsum Panels—base layer of gypsum panels

Apply liquid contact adhesive to back of TEXTONE Vinyl-Faced Gypsum Panels and face of base layer according to adhesive manufacturer's directions. Allow adhesive to air dry, then bring panels into contact. Apply pressure to entire surface to assure complete contact.

3.3 TEXTONE Vinyl-Faced Gypsum Panels—base layer of masonry, gypsum panels, wood or mineral fiber board

For interior masonry walls and gypsum board, apply continuous strips of vinyl foam tape to entire width of TEXTONE Vinyl-Faced Gypsum Panel back at midpoint and $\frac{3}{8}$ " from each end. Spread laminating adhesive over entire area of panels between tape using notched metal spreader with $\frac{1}{4}$ " x $\frac{1}{4}$ " notches spaced 2" o.c. Position panel and immediately apply sufficient pressure to assure complete contact over entire surface. (Mechanical fasteners may be substituted for tape at ends of panels.)

For application of TEXTONE Vinyl-Faced Gypsum Panels to wood or mineral board, pre-bow panels and apply laminating adhesive over entire back surface.

3.4 TEXTONE Mouldings

Finish panel joints, edges and corners with either plain TEXTONE Mouldings or mouldings to match specified panel finishes and install mouldings with fasteners 8" to 12" o.c. For snap-on mouldings, fasten through holes in the retainer clip which is included with the snap-on moulding.

Trademarks—The following trademarks used herein are owned by United States Gypsum Company or a related company: FIRECODE, SHEETROCK, TEXTONE.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

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United States Gypsum Company

101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

● DUROCK Interior Cement Board Systems



Interior systems for a variety of needs:

- Tile backer for walls, ceilings and floors.
- New $\frac{5}{16}$ " x 4' x 4' underlayment for floors and counter tops.
- Wall shield and floor protector for room heaters and stoves.

USG

DUROCK Interior Cement Board offers architects, builders and tile contractors a strong, water-damage resistant tile base for tub and shower areas. Also an ideal underlayment for tile on floors and counter tops in new construction and remodeling. Board is readily applied over wood or steel framing spaced 16" o.c. with DUROCK Wood or Steel Screws or galvanized roofing nails. After joints are treated, ceramic wall or floor tile are applied using latex fortified mortar or Type I organic adhesive.

The 1/2" thick DUROCK Boards are classified by Underwriters Laboratories, Inc., for use with UL-listed solid-fuel room heaters and fireplace stoves. Used as a wall shield, board reduces by two-thirds the manufacturer-specified clearance (minimum 12") between room heater or stove and combustible wall surface. Board may also be used as a floor protector in place of one layer of 3/8" thick millboard.

DUROCK Cement Board is formed in a continuous process of aggregated portland cement slurry and reinforced with polymer-coated, glass-fiber mesh embedded in both surfaces. Standard interior boards are produced to 1/2" thickness, cut to size and cured. Ends are square cut and edges are reinforced and formed smooth. Smooth wrapped edge is patented—No. 4,916,004.

In addition to standard 1/2" DUROCK Interior Cement Board, new DUROCK Underlayment is now available for floors and counter tops. Its 4'x4' size is easy to handle and helps cut down on waste. Its nominal 5/16" thickness helps eliminate transition trim when abutting carpet or wood flooring and helps minimize level variations with other finish materials. Applies directly over old substrate on counter tops to save time.

Also available is 1/2" thick 4'x8' DUROCK Exterior Cement Board, designed specifically for exterior wall applications but preferred by many applicators for interior use because it reduces the number of joints.

Features and Benefits

High performance—DUROCK Cement Board possesses the flexural and compressive strength, hardness and impact resistance needed for a tile base.

Smooth or textured—Board is smooth on one side for mastic applications, textured on other side for mortar applications. Textured surface enhances bonding and reduces tile slip.

Dimensionally stable—Board is rigid and exhibits excellent water-damage resistance properties as a permanent tile base. It will not swell, soften, decay, delaminate or disintegrate.

Fire-resistant—Assemblies with 1/2" DUROCK Cement Board have achieved 1- and 2-hr. fire-resistance ratings. Surface burning characteristics for DUROCK Cement Board: flame spread 5, smoke developed 0.

Lighter weight—At approximately 3 psf, this 1/2" thick tile backer weighs only one-fourth the weight of a 1" thick metal lath and cement plaster bed.

Easy installation—DUROCK Cement Board is easy to cut and fasten with DUROCK Screws or galvanized roofing nails. Simple dry panel application eliminates cement mixing and drying time, shortening job schedules and lowering in-place cost.

Sound control—Sound isolation ratings up to 65 STC are offered with steel-framed partitions.

Convenient Sizes—Interior Cement Board may be ordered in sizes to meet job requirements. A 5/8" thickness is available and custom lengths from 30" to 96".

Versatile application—DUROCK Cement Board provides a smooth, sound base for glass and ceramic mosaics; ceramic and quarry tile; lugged tile; thin stone tile and thin brick. Suitable for application to

wood or steel framing spaced 16" o.c. in new construction and in remodeling. Board is ideal for use in interior partitions, walls, floors and ceilings in wet or dry areas. It is highly efficient in high-moisture areas found in baths, showers, kitchens and laundry rooms.

Limitations

- 1 DUROCK Interior Cement Board is only for interior construction. (See SA-700 DUROCK Exterior Cement Board Systems for information on exterior applications.)
- 2 Maximum stud spacing: 16" o.c. (24" o.c. for cavity shaft wall assembly); maximum allowable deflection, based on stud properties only, L/360. Maximum fastener spacing: 8" o.c. for wood and steel framing; 6" o.c. for ceiling applications.
- 3 Maximum dead load for ceiling system is 7.5 psf.
- 4 Steel framing must be 20 ga. or heavier.
- 5 Do not use drywall screws or drywall nails.

Product Data

Material: Aggregated portland cement board with polymer-coated, glass-fiber mesh completely encompassing edges, back and front surfaces.

Sizes¹

Type	Thickness	Width	Lengths	Shipping Units ²
Interior Board	1/2"	3'	4', 5', 6'	40
Exterior Board	1/2"	4'	8'	20
Underlayment	5/16"	4'	4'	40

(1) Minimum quantity required for custom sizes.

(2) Stretch-wrapped and shipped in packaging units as shown.

Edges: Formed smooth. **Ends:** Square cut.

Building Code Data

DUROCK Interior Cement Board Systems recognized by National Evaluation Report No. NER 259 and DUROCK Exterior Cement Board Systems recognized by No. 396 (CABO:BOCAI, ICBO, SBCCI).

Standards

DUROCK Interior Cement Board exceeds the ANSI Standards for cementitious backer units.



LISTED 34L2

For floor protectors and wall shields.

Typical physical properties

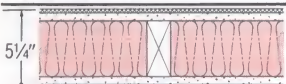
Property	ASTM Test reference	1/2" board value	5/16" underlayment value
Flexural strength—psi	C947	750	1250
Indentation strength—psi 1" dia. disc @ 0.02" indent.	D2394	2300	2300
Nail pull resistance—lb	C473	125	—
Weight—psf	C473	3	2
Surface burning characteristics—flame/smoke	E84	5/0	5/0
Thermal "R" value	C177	0.26	—
Standard method for evaluating ceramic floor tile installation systems	C627	Residential	Residential

1-Hour Partitions


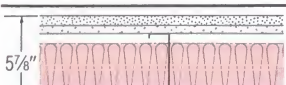
Wood-Framed/Load Bearing

RC-1 Channel

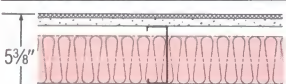
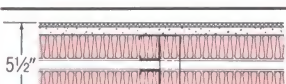

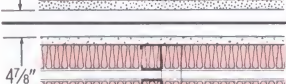
THERMAFIBER Insulation

Detail/Physical Data	Description	Fire Test	STC	Sound Test	Reference
	1/2" DUROCK interior cement board and 1/4" ceramic tile—2x4 16" o.c.—3 1/2" THERMAFIBER SAFB—board att with 1 5/8" DUROCK screws or 1 1/2" galv nails 8" o.c.—joints taped—alt. design 5/8" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U329	37 40	USG-840404 Based on alt. design— USG-840314	A

Steel-Framed/Load Bearing

	1/2" DUROCK interior cement board—base layer 5/8" SHEETROCK brand gypsum panels, FIRECODE core—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 5/8" DUROCK screws 8" o.c.—joints taped	UL Des U473	N/A		B
	5/8" SHEETROCK brand gypsum panels, FIRECODE C core—base layer 1/2" DUROCK interior cement board—board att with 1 1/4" DUROCK screws 24" o.c.—3 1/2" studs 16" o.c.—3" THERMAFIBER SAFB	UL Des U485	N/A		C

Steel-Framed/Non-Load Bearing

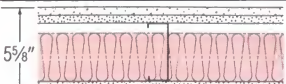
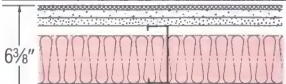
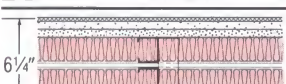

	1/2" DUROCK interior cement board and 1/4" ceramic tile—3 5/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/4" DUROCK screws 8" o.c.—joints taped—alt. design 5/8" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U442	51 53	SA-840321 Based on alt. design— SA-840313	D
	Plumbing Chase Wall—1/2" DUROCK interior cement board and 1/4" ceramic tile—1 5/8" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/4" DUROCK screws 8" o.c.—joints taped—alt. design 5/8" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U445	61 60	Based on 3" SAFB & 3 5/8" studs—SA-840524 Based on 3" SAFB & alt. design—SA-840515	E
	1/2" DUROCK interior cement board—3 5/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/4" DUROCK screws 8" o.c.—joints taped and treated—5/8" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U457	50	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core—USG-840222	F
	Plumbing Chase Wall—1/2" DUROCK interior cement board—1 5/8" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/4" DUROCK screws 8" o.c.—joints taped—5/8" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U458	57	Based on 3 5/8" studs & 3" SAFB—SA-840505	G

2-Hour Partitions

Wood-Framed/Load Bearing

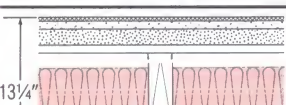
	Plumbing Chase Wall—1/2" DUROCK interior cement board and 1/4" ceramic tile—2 rows 2x4 16" o.c. on 2x8 cor plate—3 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 5/8" DUROCK screws or 1 1/2" galv. nails 8" o.c.—joints taped	WHI-495-0505 & 0508 load bearing up to 50% allowable design load	50	SA-840523	H
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Steel-Framed/Non-Load Bearing

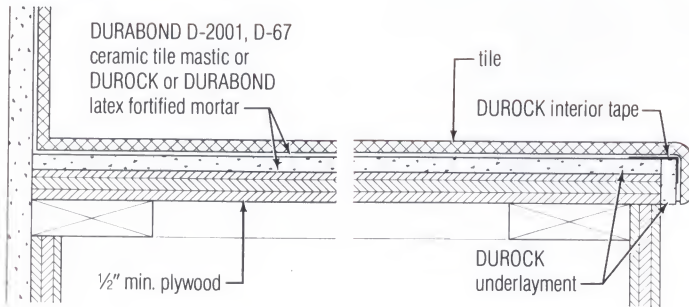
	1/2" DUROCK interior cement board—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side, double-layer other side—3 5/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 5/8" DUROCK screws 8" o.c.—joints taped	UL Des U474	N/A		I
	2 layer—1/2" DUROCK interior cement board and 1/4" ceramic tile—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—3 5/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 5/8" DUROCK screws 8" o.c.—joints taped—alt. design 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side	UL Des U443	61 59	SA-851028 Based on alt. design— SA-851016	J
	Plumbing Chase Wall—2 layer—1/2" DUROCK interior cement board and 1/4" ceramic tile—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1 5/8" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 5/8" DUROCK screws 8" o.c.—joints taped—alt. design 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side	UL Des U444	65 62	SA-851112 Based on alt. design— SA-851102	K
	Cavity Shaft Wall—1/2" DUROCK interior cement board—5/8" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20-ga. min C-H studs 24" o.c.—1 1/2" THERMAFIBER SAFB—cement board screw att with 1 5/8" DUROCK screws 8" o.c. & laminated to gypsum panel with 4" strip ceramic tile mastic applied with 1/4" notched trowel midway betw studs—joints fin	UL Des U459	N/A		L

2-Hour Floor/Ceiling

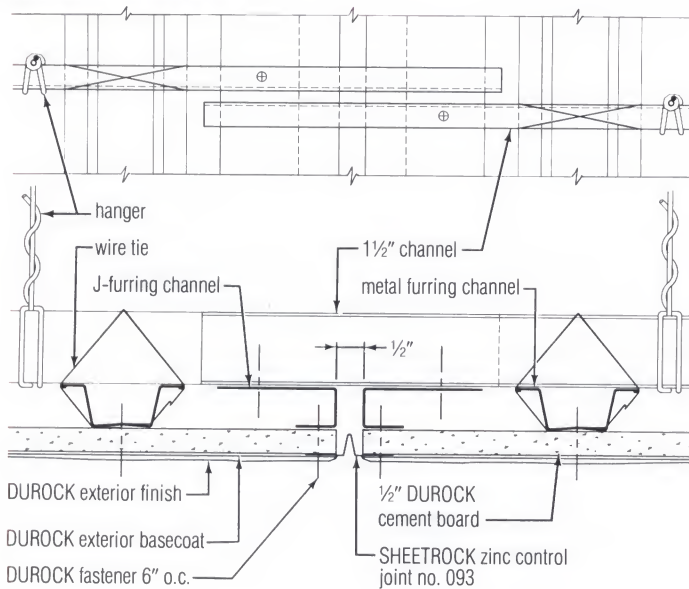
Wood-Framed/Load Bearing

	Floor/ceiling—floor of 8"x8" ceramic tile and 1/2" DUROCK exterior cement board installed with Type I multi-purpose ceramic tile adhesive, 1" SHEETROCK brand gypsum liner panels, 1/2" plywood over SHEETROCK acoustical sealant—3" THERMAFIBER SAFB 1" above bottom of joists—ceiling of 2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 resilient channels at 16" o.c.	UL Des L541	60	RAL-TL89-141 (54 MTC) RAL-IN89-5 (52 IIC)	M
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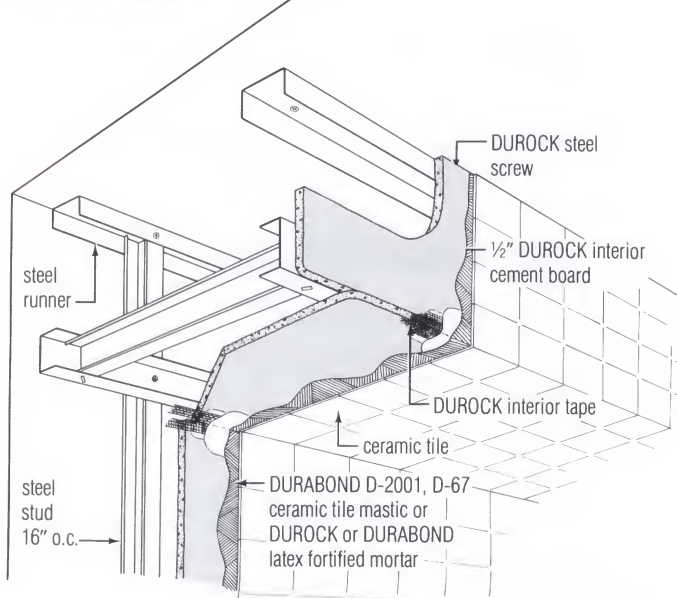
Counter Tops



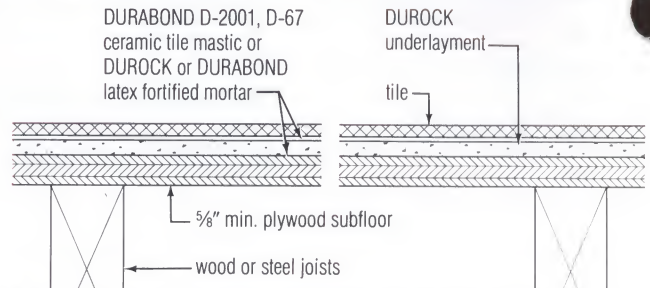
Suspended ceiling detail



Steel soffit framing

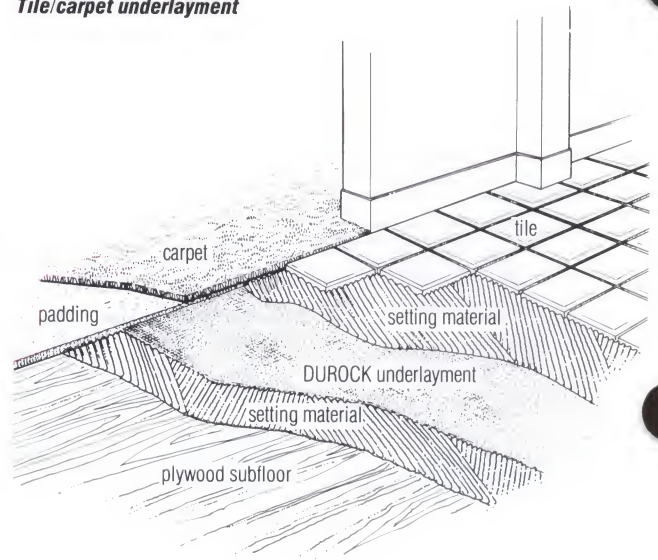


Floors, interior-wood or steel joists

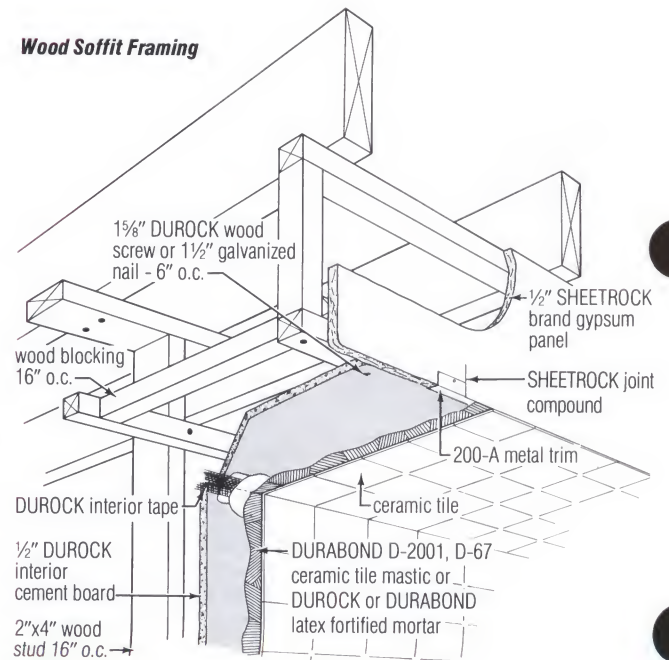


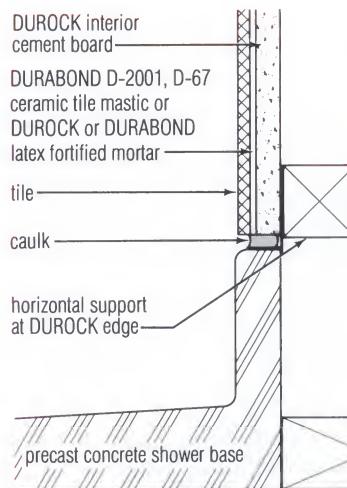
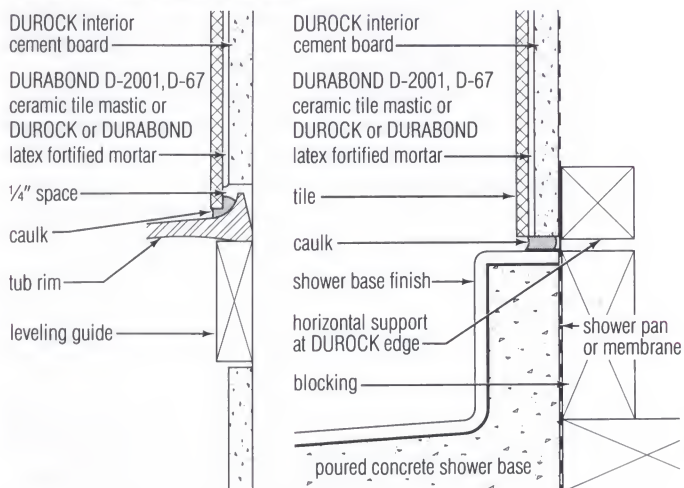
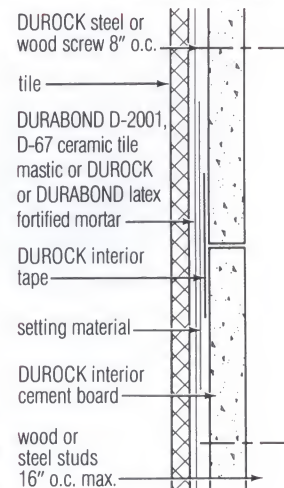
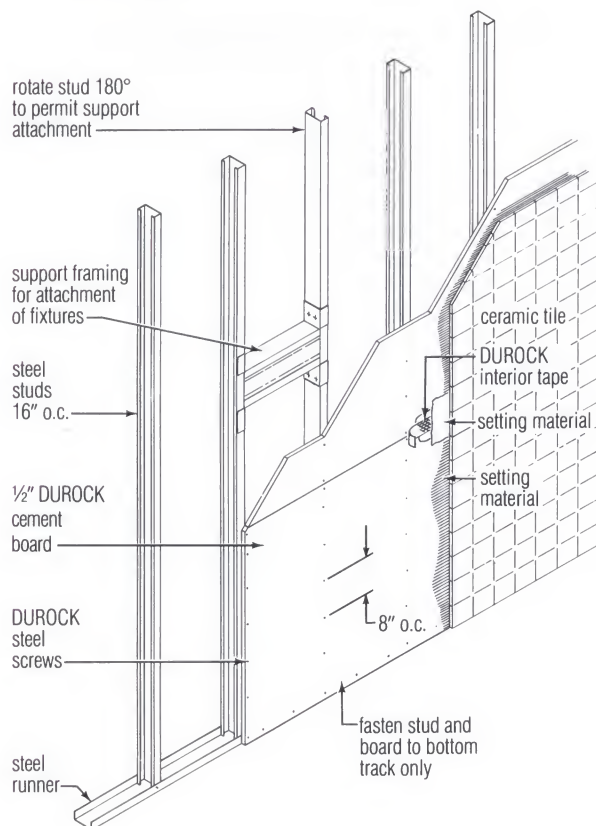
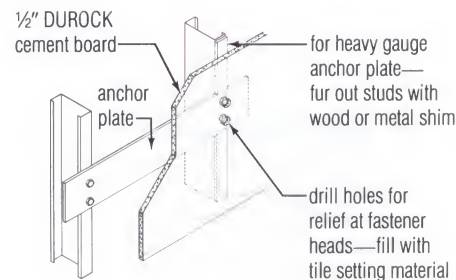
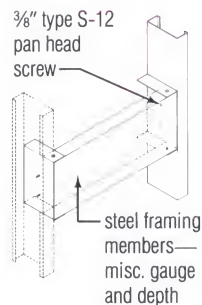
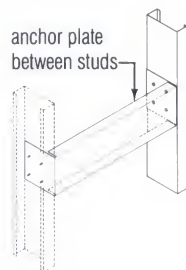
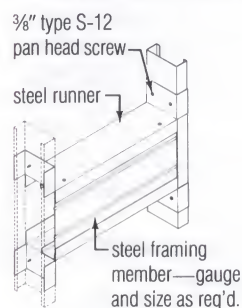
Note: For floor and counter top applications, use latex fortified mortar for heavy tiles, quarry, pavers, button-back, etc. For floor tiles over 6" x 6" use D-40 or DUROCK Latex Fortified Mortar.

Tile/carpet underlayment



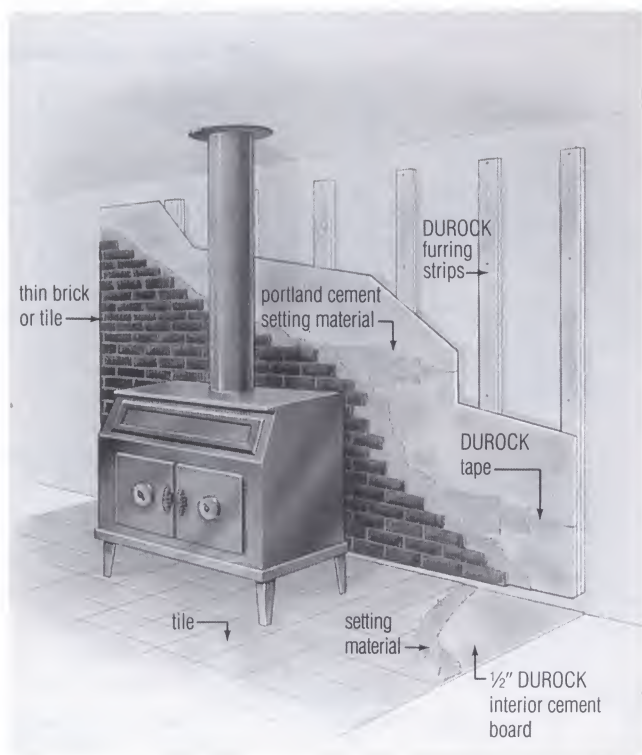
Wood Soffit Framing



Tub and shower - single layer board**Walls, interior - wood or steel studs****Fixture attachment - steel framing****Fixture Attachment Load Table**

Fastener	Size		Base assembly	Allowable withdrawal resistance		Allowable shear resistance	
	in	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
toggle bolt or hollow wall anchor	1/8	3.18	1/2" cement board & steel stud	70	311	100	445
	3/16	4.76		80	356	125	556
	1/4	6.35		155	689	175	778
3/8" Type S-12 pan head screw			20-ga. steel to 20-ga. steel	53	236	133	680
two bolts welded to steel insert	3/16	4.76	see grab bar attachment in SA-923	175	778	200	890
	1/4	6.35		200	890	250	1112
bolt welded to 1 1/2" chan.	1/4	6.35	see plumber's bracket in SA-923	200	890	250	1112

(1) Newtons



- 1 System Performance**—Systems covered herein have been tested and evaluated for use as described. For other system applications, consult with your local representative.

All details, specifications, and data contained in this literature are intended as a general guide for using DUROCK Interior Cement Board Systems. These products must not be used in a design or construction of any given structure without complete and detailed evaluation by a qualified structural engineer or architect to verify suitability of a particular product for use in the structure.

Information in this publication should be used only for DUROCK Interior Cement Board Systems, as physical properties of competitive products may vary. United States Gypsum Company and DAP Inc. assume no liability for failure resulting from the use of alternative materials or improper application or installation of DUROCK Interior Cement Board Systems as specified herein.

United States Gypsum Company and DAP Inc. will provide building officials and design professionals upon written request with test certification for published fire, sound and structural data covering systems constructed with Company products and assembled to meet performance requirements of established test procedures specified by various agencies.

- 2 Expansion and Contraction**—Interior wall surfaces should be isolated with surface control joints (sometimes referred to by the industry as expansion joints) or other means where: (a) a wall abuts a structural element or dissimilar wall or ceiling; (b) construction changes within the plane of the wall; (c) interior surfaces exceed 16' in either direction. Surface control joint width should comply with architectural practices.

Location of building control joints must be detailed by the architect. Steel framing at building control joints that extend through the wall (with top and bottom runner tracks broken) should have 1½" cold-rolled channel alignment stabilizers spaced a maximum of 5'0" o.c. vertically. Channels should be placed through holes in the stud web of the first two adjacent studs on

both sides of the joint and securely attached to the first adjacent stud on either side of the joint.

Cement board should be separated at all surface and building control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant complying with architectural practices and sealant manufacturer recommendations.

- 3 Special Size Considerations**—In large wall areas where it is desirable to minimize the number of joints or where other design considerations dictate the use of a longer or wider board, use DUROCK Exterior Cement Board, ½" thick, 48" wide, 8' long.
- 4 Water Barrier**—DUROCK Interior Cement Board is vapor permeable but provides resistance to water penetration. If a vapor retarder or waterproof construction is specified, a separate barrier must be applied over or behind the DUROCK Board.
- 5 Swimming Pool Enclosures**—DUROCK Cement Board Systems may be used for the walls and ceilings around indoor swimming pools. Consideration shall be given for adequate ventilation and protection of metal hangers and framing members.
- 6 Steam Rooms and Saunas**—For steam rooms and saunas where temperatures exceed 120°F for extended periods, use dry-set or latex-portland cement mortar; do not use organic adhesive.
- 7 Additional Information**—For complete specifications and more information on United States Gypsum Company products and systems, see the following technical folders:

SA-700	DUROCK Exterior Cement Board Systems
SA-920	Plaster Products, Accessories and Systems
SA-923	Drywall/Steel-Framed Systems
SA-924	Drywall/Wood-Framed Systems
SA-927	Gypsum Panels and Accessories
WB-1868	USG High Performance Floor/Ceiling Systems

For more information on DUROCK Interior Cement Board Systems and accessories, see the following technical data sheets:

A-1051	DURABOND Adhesives, Grouts, Mortars, Additives
CB-164	Fire and Sound Test Data
CB-198	Floor Protectors and Wall Shields
CB-199	Ceramic Tile Ceilings
CB-232	Joint Taping, Fasteners, Setting Materials
CB-758	Installation Guide for Wood Framing
CB-799	Installation Guide for Steel Framing

For additional information on cement board products, contact United States Gypsum Company, 1-800-347-1345. For additional information on adhesives, mastics, mortars and grouts, contact DAP Inc. at 1-800-634-8382.

For more information on tile systems, special construction conditions such as expansion joints, tubs and showers, and recommended materials and methods, refer to current Tile Council of America Handbook and ANSI Specifications for Installation of Ceramic Tile Standards.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company and DAP Inc. and shall be installed in accordance with their current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during backer board and tile installation, temperatures within the building shall be maintained within the range of 45° to 100°F. Adequate ventilation shall be provided to carry off excess moisture. Wood framing shall approximate the moisture content it will reach in service by allowing the enclosed building to stand as long as possible prior to the application of the backer board. Do not install board when it is wet.

1.5 Framing

Steel or wood wall framing to receive DUROCK Board shall be structurally sound, free from bow, and in general compliance with local building code requirements. Damaged and excessively bowed studs shall be replaced before installation of DUROCK Board. Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection. Steel framing must be 20-ga. or heavier with a corrosion-resistant metal coating equivalent to G60 hot dipped galvanized.

Part 2: Products

2.1 Materials

A Cement Board

—DUROCK Interior Cement Board, 1/2" thickness, 36" width x (48") (60") (72") length.

—DUROCK Exterior Cement Board, 1/2" thickness, 48" width x 96" length.

—DUROCK Underlayment, 5/16" thickness, 48" width x 48" length.

B Joint Reinforcement—DUROCK Interior Tape.

C Fasteners

—DUROCK Steel Screws, 1 1/4" and 1 5/8" for 14 to 20-ga. steel framing; DUROCK Wood Screws, 1 1/4", 1 5/8" and 2 1/4" for wood framing.

—Nails, (1 1/2" hot-dipped galvanized roofing nails).

—Staples, (1/4" x 7/8" galvanized staples for DUROCK Underlayment).

D Subfloor—(5/8") (3/4") plywood, 4' x 8' sheets, exterior grade or better, exterior glue conforming with PS-1-66, T&G or back block long edges.

E Adhesives/mortars

—Meeting ASTM C557-73: Multi-Purpose Adhesive (for subfloor attachment).

—Meeting ANSI A136.1 Type I: DURABOND D-67 Multi-Purpose Ceramic Tile Mastic or DUROCK or DURABOND Multi-Purpose Ceramic Tile Mastic.

—Meeting ANSI A118.4: DURABOND D-40 or DUROCK Latex Fortified Mortar, DURABOND D-30 Thin-Cut Marble and Granite Mortar.

—Meeting ANSI A118.1: DURABOND D-50 Thin-Set Mortar. Can be mixed with DURABOND D-L16 Acrylic Latex Additive.

F Grout

—Meeting ANSI A118.6: DUROCK LFG 250 Latex Fortified Grout; DURABOND C-150 Commercial Dri-Set Grout mixed with DURABOND D-L26 Acrylic Latex Grout Additive.

G Tile—Tile shall meet ANSI A137.1.

Part 3: Execution

3.1 Floors

A Subfloor—Apply 3/8" bead of multi-purpose adhesive to center of top flange of joists. Place 5/8" min. exterior grade plywood sheets with long dimension across or parallel to wood or steel joists spaced max. 16" o.c. Fasten plywood to steel joists with 1 1/16" pilot point Type S-12 screws spaced 16" o.c. Fasten plywood to wood joists with adhesive and suitable nails or screws spaced max. 12" o.c.

B Panel Application—Laminate 5/16" DUROCK Underlayment to subfloor using ceramic tile mastic, latex fortified mortar or thin-set mortar mixed with acrylic latex additive applied to subfloor with 1/4" square-notched trowel for thin set, 5/32" V-notched trowel for mastic. Place underlayment with joints staggered from subfloor joints. Fit ends and edges closely but not forced together. Fasten to subfloor with 1 1/4" DUROCK Wood Screws or 1 1/2" galvanized roofing nails spaced 8" o.c. in both directions with perimeter fasteners at least 3/8" and less than 5/8" from ends and edges; or with 1/4"x7/8" galvanized staples spaced 4" o.c. in both directions. Prefill joints with tile-setting mortar or adhesive and then immediately embed tape and level joints. As an alternative, apply DUROCK Interior Tape over the joints and then apply tile-setting mortar or adhesive, forcing it through the tape to completely fill and level the joints. This may require several passes to accomplish.

1/2" DUROCK Cement Board—Same procedure as DUROCK Underlayment except fastening with staples is not permitted.

3.2 Walls

A Framing—Space wood and steel framing a maximum of 16" o.c. (24" o.c. for UL Design U459). The studs of freestanding furred walls must be secured to exterior wall with wall furring brackets or laterally braced with horizontal studs or runners spaced 4' o.c. max.

B Panel Application—After tub, shower pan or receptor is installed, place temporary 1/4" spacer strips around lip of fixture. Pre-cut board to required sizes and make necessary cut-outs. Fit ends and edges closely but not forced together. Install board abutting top of spacer strip. Stagger end joints in successive courses. Fasten boards to wood studs spaced max. 16" o.c. and bottom plates with 1 1/4" DUROCK Wood Screws or 1 1/2" galvanized roofing nails spaced 8" o.c. Fasten boards to steel studs spaced max. 16" o.c. and bottom runners with 1 1/4" DUROCK Steel Screws spaced 8" o.c. with perimeter fasteners at least 3/8" and less than 5/8" from ends and edges. In double-layer walls where backer boards are installed over base-layer gypsum boards, apply a water barrier (not a vapor retarder) over gypsum boards. Prefill joints with tile-setting mortar or adhesive and then immediately embed tape and level the joints. As an alternate, apply DUROCK Interior Tape over the joints and then apply tile-setting mortar or adhesive, forcing it through the tape to completely fill and level the joints. This may require several passes to accomplish.

3.3 Counter Tops

A Base—Install min. 1/2" exterior grade plywood base across wood cabinet supports spaced max. 16" o.c. Position ends and edges over supports.

B Panel Application—Laminate $\frac{5}{16}$ " DUROCK Underlayment to plywood using ceramic tile mastic, latex fortified mortar or thin-set mortar mixed with acrylic latex additive applied to plywood with $\frac{1}{4}$ " square-notched trowel for thin set, $\frac{5}{32}$ " V-notched trowel for mastic. Fasten to plywood with $1\frac{1}{4}$ " DUROCK Wood Screws or $1\frac{1}{2}$ " galvanized roofing nails spaced 8" o.c. in both directions and around edges; or with $\frac{1}{4}$ "x $\frac{7}{8}$ " galvanized staples spaced 4" o.c. in both directions and around edges. Prefill joints with tile-setting mortar or adhesive and then immediately embed tape and level joints. As an alternative, apply DUROCK Interior Tape over the joints and then apply tile-setting mortar or adhesive, forcing it through the tape to completely fill and level the joints. This may require several passes to accomplish.

$\frac{1}{2}$ " Durock Cement Board—Same procedure as DUROCK Underlayment except fastening with staples is not permitted.

3.4 Ceilings

A Framing—Ceiling joists, furring channels or strips must be spaced max. 16" o.c. Framing must be capable of supporting the total ceiling system dead load, including insulation, ceramic tile, bonding materials and cement board, with deflection not exceeding L/360 of the span. When steel framing is used, min. 20-ga. is required.

B Panel Application—Apply $\frac{1}{2}$ " DUROCK Cement Board to framing with long dimension across framing. Center end or edge joints on framing and stagger joints in adjacent rows. Fit ends and edges closely, but not forced together. Fasten boards to steel framing with $1\frac{1}{4}$ " DUROCK Steel Screws spaced 6" o.c. and to wood framing with $1\frac{5}{8}$ " DUROCK Wood Screws spaced 6" o.c. with perimeter fasteners at least $\frac{3}{8}$ " and less than $\frac{5}{8}$ " from ends and edges. If necessary, provide additional blocking to permit proper attachment. Edges or ends parallel to framing shall be continuously supported. Prefill joints with tile-setting mortar or adhesive and then immediately embed tape and level the joints. As an alternate, apply DUROCK Interior Tape over the joints and then apply tile-setting mortar or adhesive, forcing it through the tape to completely fill and level the joints. This may require several passes to accomplish.

3.5 Wall Shield

A Furring—Cut $\frac{1}{2}$ " DUROCK Interior Cement Board to panel and furring strip sizes with a scoring tool. Attach a double layer of furring strips to wall framing with $2\frac{1}{4}$ " DUROCK Wood Screws or

$2\frac{1}{4}$ " galvanized roofing nails with $\frac{3}{4}$ " minimum framing penetration.

B Panel Application—Attach $\frac{1}{2}$ " DUROCK Cement Board wall shield through furring to wall framing with $2\frac{1}{4}$ " galvanized roofing nails with $\frac{3}{4}$ " minimum framing penetration. Prefill joints with latex-fortified portland cement mortar and then immediately embed tape and level the joints. As an alternate, apply DUROCK Tape over the joints and then apply latex-fortified portland cement mortar, forcing it through the tape to completely fill and level joints. This may require several passes. Optional: Finish with thin brick or ceramic quarry tile set in a bed of latex-fortified mortar. Grout tiles.

3.6 Floor Protector

A Panel Application—Apply $\frac{1}{8}$ " to $\frac{1}{4}$ " thick latex-fortified portland cement to solid surface—never on top of carpeting or padding. Attach $\frac{1}{2}$ " DUROCK Cement Board with $1\frac{1}{4}$ " DUROCK Wood Screws or $1\frac{1}{2}$ " galvanized roofing nails at 8" o.c. both directions and with $\frac{3}{4}$ " minimum flooring penetration.

B Joint Treatment and Finish—(see section 3.5B).

3.7 Tile Installation

Install tile and grout in accordance with ANSI A108.4 for Type I organic adhesive or ANSI A108.5 for dry-set or latex portland cement mortar and ANSI A108.10 for grouts. Before tile application begins, the moisture content of the DUROCK Cement Board should be allowed to adjust as closely as possible to the level it will reach in service. Avoid extreme changes in environmental conditions during the curing of the tile setting material. Provide adequate ventilation to carry off excess moisture.

3.8 Joint Treatment Application for Untiled Areas

For small areas where the DUROCK Board will not be tiled, such as a board extending beyond the tiled area and abutting another surface, treat joints as follows. Seal tile backer board with thinned ceramic tile mastic. (Mix four parts adhesive with one part water.) Embed SHEETROCK Joint Tape over joints and treat fasteners with SHEETROCK Setting-Type 45 or 90 Joint Compound applied in conventional manner. Flat trowel SHEETROCK Setting-Type Joint Compound over board to cover fasteners and fill voids to a smooth surface. Finish joints with at least two coats SHEETROCK Ready-Mixed Joint Compound. Do not apply ready-mixed joint compound over unsealed board.

Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (415) 792-4400; Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293; Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0770 • **Hawaii:** Honolulu, (808) 538-7712 • **Illinois:** Chicago, (312) 606-4130 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (301) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St. Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437; Oakfield, (716) 948-5287; Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Chesterland, (216) 729-1956 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Pittsburgh, (412) 341-2434 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771; Houston, (713) 666-0751 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5831.

Technical Services: Atlanta, GA (404) 393-0770 • Tarrytown, NY (914) 332-8000 • Chicago, IL (312) 606-5475 • Glendale, CA (818) 956-1882.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, DUROCK, THERMAFIBER, DURABOND, SHEETROCK, FIRECODE.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Patents: DUROCK Cement Board is covered by the following patents: No. 4,916,004; 4,450,022; 4,488,909; 4,504,335.

United States Gypsum Company

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Chicago, Illinois 60606-4385
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A Subsidiary of USG Corporation

DAP Inc.

Dayton, OH 45401
Technical Services 1-800-634-8382
A Subsidiary of USG Corporation

Wall Systems

USG Interiors, Inc.

USG

USG INTERIORS: WORKING BEAUTIFULLY At USG Interiors, we strive to combine aesthetics and performance with exceptional value in defining interior space.

That takes an eye for color, a sense of proportion, plus technical knowledge and an adherence to standards. But it also takes the ability to maintain quality with a respect for budget.

The end result: wall, ceiling and access floor systems that work beautifully to create unique, contemporary environments.

WALLS FOR EVERY WORKPLACE The following pages describe wall systems that accommodate commercial and institutional applications. Walls that meet your requirements for ease of relocation, on-time delivery, sound control and cost control. Walls with excellent durability and performance characteristics. Beautiful walls that provide options in finishes, accessibility and fire ratings.

Walls that work beautifully from USG Interiors — your complete source for wall, ceiling and access floor systems.



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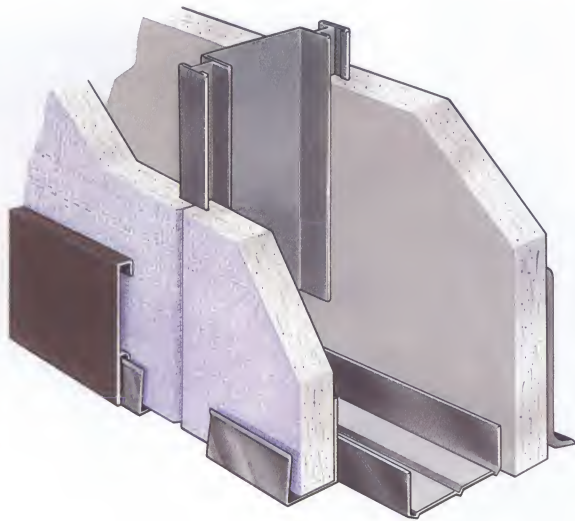
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PERFORMANCE AND ECONOMY**WITH EXCEPTIONAL FIRE AND SOUND**

RATINGS For economical sound attenuation and fire rating in the office environment, specify the ULTRAWALL system. This flexible system is based on sturdy $\frac{3}{4}$ ", pre-kerfed and prefinished gypsum panels and heavy-duty steel framing that give the system a one-hour fire rating and sound control transmission coefficient of 42⁽¹⁾. The ULTRAWALL partitions are easy to install and relocate for long-term cost savings.



(1) ULTRAWALL partitions can be modified to meet more stringent fire and sound requirements. Standard one-hour fire rating does not apply to aluminum studs. See ULTRAWALL Partition System Technical Information Guide, MP-517, for complete test data.

ULTRAWALL Partition System

Fast Assembly Once ceiling track and floor runner are in place, studs key into the kerfed edges of gypsum panels to lock panels securely. To meet changing space requirements, an entire wall or just a portion of it can be dismantled and moved.

Accepts Hanging Furniture

ULTRAWALL partitions can be erected as a system to accept most major brands of hang-on wall furniture, or an existing ULTRAWALL system can be changed to a hang-on system by replacing steel studs with aluminum studs. These universal aluminum studs accept various standards for hang-on furniture in nominal 24", 30", 48", 54" and 60" widths. So all the flexibility, efficiency and economy of hang-on furniture are yours with the privacy of full-height partitions.

Doors, Glazing and

Accessories A complete line of accessories includes steel or aluminum door frames, aluminum or steel trims, vinyl floor base molding, aluminum or steel glazing components and interface standards for wall mounting furniture.

Wire Management

A $1\frac{7}{8}$ " wide chase space lets you run utilities and communications cable either vertically or horizontally in the wall.



Flexibility Locate (and relocate) door openings, sidelites and glass walls wherever you want them. T- or H-studs accommodate different panel configurations on opposite sides of the wall or the same side if desired.



Wide Finish Selection

Flush-mounted panels come prefinished in 36 vinyl and 22 fabric finishes (contact your sales representative for material samples.)

Optional flush outside corners and trimless inside corners enhance the monolithic look. Matching exposed trim in painted or anodized aluminum, vinyl or painted steel finish is available for door and window frames and ceiling tracks.

Affordability: Immediate and Long-Term ULTRAWALL partitions are comparable in installed cost to drywall with field-applied vinyl.

Principal Components

- Prefinished, pre-kerfed gypsum panels
- Ceiling track
- Floor runner
- Studs (interchangeable)
- Glazing components
- Door frames
- Trim for ceiling, base, corners and terminations

ULTRAWALL Partition System Component Information

Panels

Gypsum Panels	3/4" x 24". Bevel edge, factory kerfed.
----------------------	--

Finish	Vinyl. Fabric.
---------------	-------------------

Attachment	Factory kerfed edge to fit stud.
-------------------	----------------------------------

Studs

Steel	Roll-formed galvanized steel "H" or "T" configuration. 3 3/8" wall thickness.
--------------	--

Aluminum	Extruded aluminum "H" or "T" configuration. 3 3/8" wall thickness.
-----------------	---

Floor Runner

Steel	Galvanized steel. 1 7/8" width, 1 1/8" return.
--------------	---

Ceiling Track

Steel	3 5/8" width, 1 1/4" return. Painted.
--------------	--

Aluminum	Flanged rail (ARL-300) or plain rail (ARL-301). 3 5/8" width, 1 1/4" return. Satin anodized, ULTRABRONZE or painted.
-----------------	--

Door Frames

Aluminum	SMR-Delta. Self mortising, reversible. Satin anodized, ULTRABRONZE or painted.
-----------------	--

Steel	Throated for installation without regard to module. 6'8", 7'0" mortised for 1 1/2 pair of 4 1/2" x 4 1/2" butt hinges and standard A-115.1 strike, or full height mortised for 2 pair hinges. Non-handed, reversible (6'8" and 7'0" only). 1 1/2 hr. Class B fire rating for 4'0" x 7'6" max. opening with metal-faced or gypsum panels. Withstands 1-million slam test. Painted.
--------------	--

Glazing

Aluminum	Nonmodular components (no glass). Satin anodized, ULTRABRONZE or painted. Glazing covers to fit door jamb or rail. Snap-on glazing stops to fit H-rail.
-----------------	--

Steel	Nonmodular components (no glass). Throated for installation without regard to module. Painted.
--------------	--

Floor Base

Vinyl snap-on base.

Trims

Aluminum	Satin anodized, ULTRABRONZE or painted.
-----------------	---

Steel	Painted.
--------------	----------

Furniture Mounting

Hardware	Interface standards mount directly to aluminum studs. Paint with touch-up paint supplied by furniture manufacturer.
-----------------	--

Sound Insulation

THERMAFIBER® sound attenuation fire blankets, paperless, semi-rigid, mineral fiber mat 24"x48" in 1" or 1 1/2" thickness.

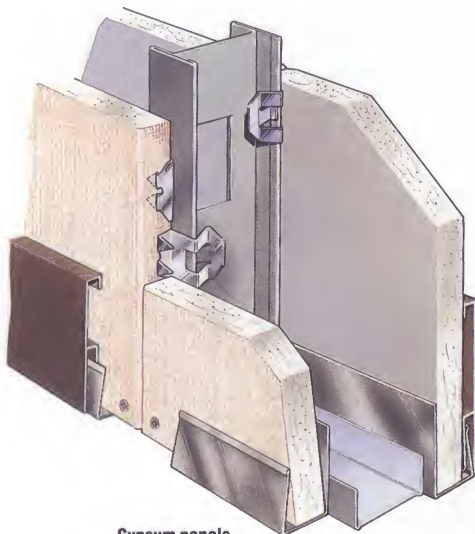
Note: For detailed technical drawings, component data and assembly information, contact your representative for ULTRAWALL Partition System Technical Information Guide, MP-517 and/or ULTRAWALL Partition System Planning, Installation and Maintenance Guide, MP-501.

**PREMIUM QUALITY, POINT-ACCESSIBLE
SYSTEM THAT OFFERS DESIGN CHOICE,
FUNCTIONAL PERFORMANCE AND HIGH
RATE OF RELOCATABILITY** This

exceptionally versatile system is ideal for most commercial and institutional settings.

Point-accessible framing system allows labor-efficient coordination with other trades.

Framing studs lock in place, top and bottom, to build stable, sturdy walls. Gypsum panels, or metal-faced panels with or without furniture hanging capabilities, can be selected to meet specific needs. Because of shared framing and unified finishes, panels can be used interchangeably. The DONN High Performance Wall system provides excellent flexibility and durability to outperform all standard stud-and-runner drywall systems.



Gypsum panels

DONN High Performance Wall System

Point Accessibility Point-accessible service cavities can be used to route, modify or maintain electrical wiring and communication lines through the walls. Panels can be removed and replaced as needed. Snap-on panel design permits easy access without disturbing framework or adjacent panels.

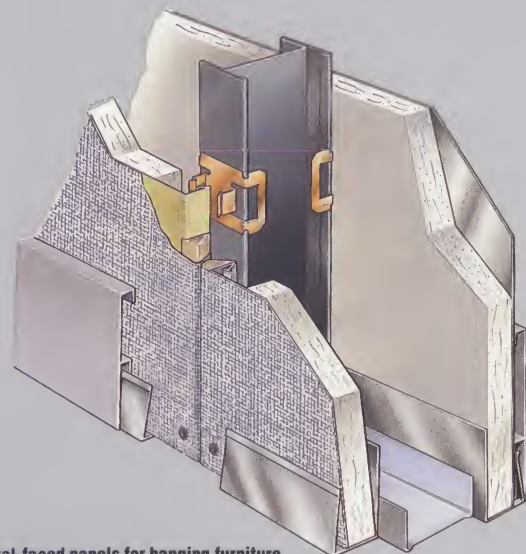
Easy Installation Walls are erected after ceilings and flooring are in place. Adjustable, interlocking components minimize field cutting. Studs adjust to varying ceiling heights, and standard stud facings allow flexible panel placement. Spacer channels lock into place on studs, giving additional stability and eliminating the need to measure. Panels attach directly to studs with field-applied clips. Solid and modular aluminum glazed panels are interchangeable—no field fabrication needed. Wall system is

able to compensate for building irregularities at floor and ceiling up to 1½" total variation without cutting or shimming.

Hanging Furniture Installation Slotted brackets that accept STEELCASE® hanging furniture attach between panels, allowing furniture to be hung at any convenient height along the wall.

High Relocatability All panels are removable and reconfigurable. Doors and glazing options can be altered or added. Or the entire wall can be disassembled and its components used elsewhere. Snap-together assembly and durable metal construction assure reusability of components.

Gypsum Panels Best suited for the office environment, lightweight ½" or ⅝" gypsum panels are available in 4' widths, to minimize panel seaming. The ⅝" panels also come



Metal-faced panels for hanging furniture

in convenient 24" and 30" widths, for ease of handling and transport to the job site. STC rating: 35-44.

Finish Selection for Gypsum Panels Predecorated panels in fashionable colors save labor costs. Standard finishes include 36 vinyls and 22 fabric finishes. (Contact your sales representative for material samples.)

Panels for Use with Hanging Furniture Tough $\frac{1}{2}$ " thick gypsum panels are faced with 25-gauge steel for durability. Tight, flush panel seams look great and accept hanging furniture at any height desired. Because framing does not require pre-leveling, labor costs for furniture hanging are reduced. These panels are perfect for executive offices, conference rooms and upscale open plan offices. Widths from 24" to 45". Panels also can be preformed to any module size required, to fit any size or type of STEELCASE furniture. STC rating: 40-43.



Finish Options for Hanging Furniture Panels Standard furniture-compatible finishes include 22 fabrics and 36 vinyls. (Contact your sales representative for material samples.)

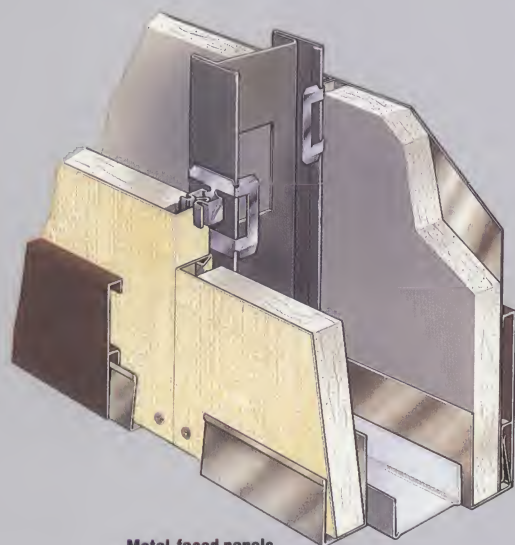
Metal-Faced Panels These panels are recommended for high-traffic areas such as schools, health care facilities, research settings and plants. 25-gauge steel panel facings over $\frac{1}{2}$ " or $\frac{5}{8}$ " gypsum panels stand up to wear and tear. Metal panel edge gives high recoverability during relocation cycles and extends panel life. Metal facing allows custom size panel widths to be pre-manufactured, to minimize field cutting and meet special conditions such as columns and special corners. STC rating: 40-43. One-hour fire rating available.

Specialty Finishes for Metal-Faced Panels Specialty finishes such as stainless steel, enamel paint,

porcelain chalkboard, vinyl and custom laminates meet diverse functional requirements. (Contact your sales representative for material samples.)

Principal Components

- Prefinished gypsum panels
- Prefinished metal-faced gypsum panels
- Ceiling track
- Floor runner
- Studs (with telescopic extender)
- Spacer channels (interlocking)
- Panel attachment clips
- Trim for base, corners and edges
- Door frames
- Glazing, components and accessories



Metal-faced panels

DONN High Performance Wall System Component Information

Gypsum Panels

Panels	1/2" x 48". 5/8" x 24", 30", or 48". Bevel edge.
Finish	Vinyl or fabric.
Attachment	Impaled edge clip.

Metal-Faced Panels

Panels	Steel, 25-gauge. 1/2" or 5/8" thick. 24" or 30" wide. Gypsum core. Square edge.
Finish	Vinyl. Fabric. Painted. Porcelain chalkboard coated. Stainless steel.
Attachment	Spring steel clips attached to studs grasp arrowhead edge of metal facing.

Metal-Faced Panels for Use with Hanging Furniture

Panels	Steel, 25-gauge. 1/2" thick. 24", 25", 30", 35", 36", 42", or 45" wide. Gypsum core. Square edge.
Finish	Vinyl. Fabric. Painted. Porcelain chalkboard coated. Stainless steel.
Attachment	Spring steel clips attached to studs grasp arrowhead edge of metal facing.

Furniture Mounting

Hardware	Slotted brackets for STEELCASE furniture mount directly to studs. Painted.
-----------------	---

Studs

Steel	Roll-formed steel. 2" depth. Holes punched for utility passage. Locking stud extender allows for 1 1/2" variation in floor to ceiling height.
--------------	--

Ceiling Track

Steel	3" or 3 1/4" width. 1 3/8" return. Painted.
--------------	---

Floor Runner

Steel	2" width. 1" return.
--------------	-------------------------

Spacer Channels

	24", 25", 30", 35", 36", 42", or 45" lengths (nominal).
--	---

Door Frames

Aluminum	Flush for on- or off-module conditions. 7'-0" mortised for 1 1/2" pair or full height mortised for two pair 4 1/2" x 4 1/2" butt hinges and standard A-115.1 strike. Painted.
Steel	Throated for installation without regard to module. 6'-8", 7'-0" mortised for 1 1/2" pair of 4 1/2" x 4 1/2" butt hinges and standard A-115.1 strike, or full height mortised for 2 pair hinges. Non-handed, reversible (6'-8" and 7'-0" only). 1 1/2 hr. Class B fire rating for 4'-0" x 7'-6" max. opening with metal-faced or gypsum panels. Withstands 1-million slam test. Painted.



Glazing

Aluminum	Flush modular units (no glass). Interchangeable with solid panels. Leveling devices accommodate up to 1 1/2" in floor variation. Clerestory, sidelite, chair rail and full height glazing. Painted.
Steel	Nonmodular components (no glass). Throated for installation without regard to module. Painted.

Floor Base

	Vinyl snap-on base.
--	---------------------

Trims

Aluminum	Painted.
Steel	Painted.

Sound Insulation

	THERMAFIBER sound attenuation fire blankets, paperless, semi-rigid, mineral fiber mat 24" x 48" in 1" or 1 1/2" thickness.
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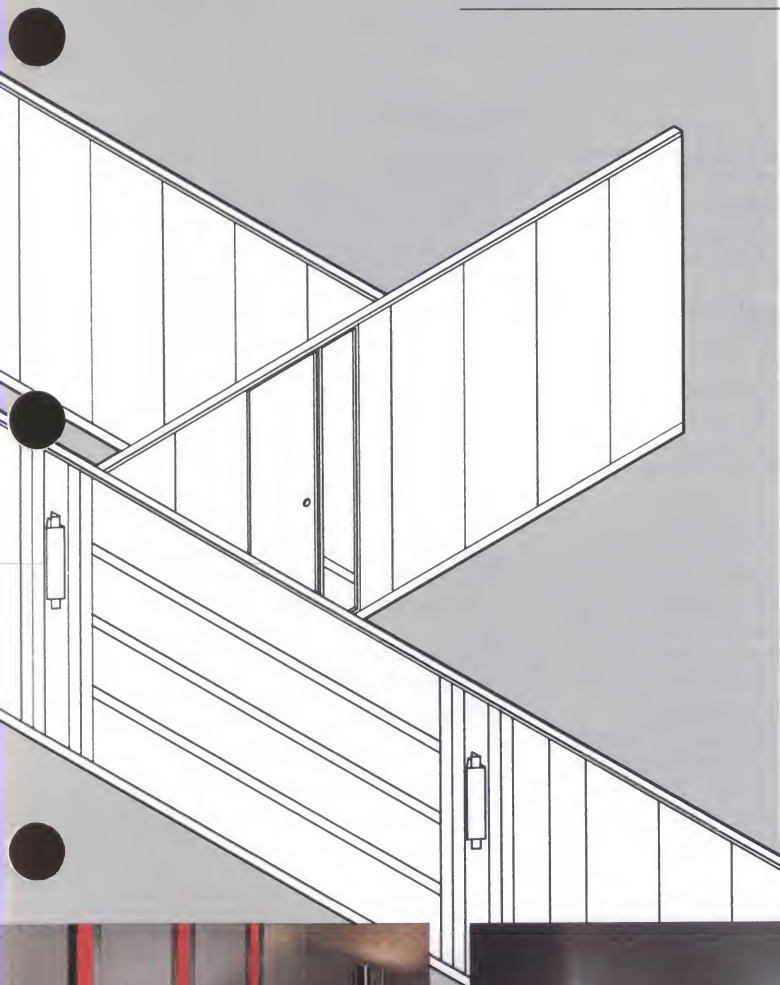
Note: For detailed technical drawings, component data and assembly information, contact your representative for DONN High Performance Wall System Technical Information Guide, MP-574 and/or DONN High Performance Wall System Planning, Installation and Maintenance Guide, MP-585.

DOWN High Performance Wall System

**VARIABLE MODULE SIZES FOR INFINITE
DESIGN POSSIBILITIES**

Prefinished metal panels can be placed horizontally as well as vertically in the wall. Finish options include fabrics, metals, vinyls and paints. Or select custom finishes for unique applications.

Extended capabilities also include incremental and modular wall systems.



ULTRAWALL Partition System**Part 1—General****1.01 Related Work**

- A** Related work specified elsewhere:
- (1) Conventional door and glass frames: Section_____.
 - (2) Wood doors: Section_____.
 - (3) Glazing: Section_____.
 - (4) Finish hardware: Section_____.
 - (5) Painting: Section_____.

1.02 System Description

- A** Interior wall system: Partitions shall be bevel edge type, 3/8" thick. Wall centerlines are as shown on plans. System also provides door and glass frames, trims and base.

1.03 Quality Assurance

- A** Wall system components shall be sourced from one manufacturer which certifies that materials meet or exceed these specifications.
- B** Installing contractor: Installer shall have a history of completed jobs of similar size and scope. Contractor shall be registered and authorized by the manufacturer.
- C** Sound transmission: Provide independent laboratory certification that wall system provides 42 STC (gypsum partitions tested in accordance with ASTM E90).
- D** Fire protection: When required on drawings, provide independent laboratory certification that wall system has been successfully tested for 1-hour and 2-hour fire endurance and hose-stream in accordance with ASTM E119.
- E** Structural: Provide transverse load rating and impact resistance tests.

1.04 Submittals

- A** Samples: Submit finish and color samples.
- B** Manufacturer's data called for in quality assurance section and finish performance data per Section 2.02B.
- C** The partition contractor shall submit shop drawings for assemblies or conditions not fully described on working drawings.

1.05 Environmental Conditions

- A** Temperature within the building shall be above a constant minimum of 65°F with relative humidity not over 70% during erection of a partition. When required, heat shall be furnished by the general contractor. Erection of the partition systems shall not begin until building exterior provides complete protection from the outside weather. Panels shall not be stored where they are subjected to temperature, moisture or humidity extremes.

1.06 Delivery, Storage and Handling

- A** Prefinished materials shall arrive at job site in their original unopened cartons or other protective packaging necessary to protect finishes. Materials should be stored in such packages until time of application. Bulk items (studs and tracks) shall arrive in banded bundles for ease of handling and distribution. Panels shall arrive and remain on adequate support to ensure flatness and prevent damage.

Part 2—Products**2.01 Manufacturer**

- A** ULTRAWALL partition system as manufactured by USG Interiors, Inc., Chicago, IL.

2.02 Materials

- A** Framing:
- (1) Roll-formed steel or extruded aluminum studs, as indicated on drawings, providing for attachment of gypsum panels and allowing for utility passage. Extruded aluminum studs shall be used for furniture attachment.
 - (2) Struts/Runners shall be roll-formed galvanized steel to hold panels in alignment.
 - (3) Ceiling track of (steel) (aluminum) shall be designed to stabilize wall at ceiling, cover panel tops or provide for covering trim, and integrate with full-height door and glass framing.
- B** Panels:
- (1) ULTRAWALL panels shall be composed of factory kerfed gypsum board measuring 3/4" thick by (24") (30") wide by (9') (10') long.
 - (2) ULTRAWALL panels shall be predecorated in manufacturer's standard vinyl or fabric. Panels shall be factory kerfed and bevel-edged for uniform joint appearance.
 - (3) Finish performance data per the following schedule shall be made available prior to bid:
 - (a) Impact resistance (ASTM D2794).
 - (b) Flame spread (ASTM E84).
- C** Glazing Components:
- Glazing shall be (aluminum) (steel) to integrate with runner, glazing and trim components. Glass furnished by others.
- D** Door Frames:
- Door frames shall be (aluminum) (steel) to integrate with runner, glazing and trim components. Frames shall measure (6'8") (7'0") (ceiling height) and () wide unless otherwise noted on drawings. Frames shall be (nonhanded reversible) (left and right handed) and mortised for (1 1/2) (2) pair of 4 1/2" x 4 1/2" butt hinges and standard A-115.1 strike unless otherwise noted.
- E** Aluminum ceiling track, glazing and door frames shall be (satin anodized) (ULTRABRONZE anodized) (painted in manufacturer's standard colors.) Steel ceiling track, glazing and door frames shall be painted in manufacturer's standard colors.
- F** Snap-on vinyl base. Color of base shall be from manufacturer's standard colors.
- G** Trims:
- Trims shall be ([satin] [ULTRABRONZE] anodized) (painted) aluminum or (painted) (vinyl-covered) steel to match other system components and made with (square-edge) (radiused) outside corners.
- H** Furniture mounting hardware:
- Provide one interface standard assembly each side of wall mounted furniture. Interface standards to be painted to match furniture with touch up paint from furniture manufacturer.

- I** Sound insulation shall be THERMAFIBER Sound Attenuation Fire Blankers, paperless, semi-rigid, spun mineral fiber mat (1") (1 1/2") 24" x 48".

Part 3—Execution**3.01 Inspection**

- A** Before stocking or installing materials, the contractor should inspect the building site to verify that floors and ceilings contain no defects which would result in a poor installation of the wall system. At this time, floor-to-ceiling measurements should be taken at enough points to ensure correct installation of full-height frames.

3.02 Installation

- A** Lay out partitions. Securely attach floor and ceiling runners. Accurately plumb strut studs at door openings and ULTRAWALL terminals.
- B** Install ULTRAWALL panels, studs and trim members in accordance with USG Interiors, Inc. installation directions. Complete installation with vinyl base, door frames and trim.
- C** Erect partitions to be rigid, plumb, with horizontal lines leveled, neat in appearance, and free from defects in workmanship. Conceal all connections to walls, floors, ceilings, cornice sections, and connections between gypsum panels. Adjust all hardware to proper working order.

Down High Performance Wall System**Part 1—General****1.01 Related Work**

- A** Related work specified elsewhere:
- (1) Conventional door and glass frames: Section_____.
 - (2) Wood doors: Section_____.
 - (3) Glazing: Section_____.
 - (4) Finish hardware: Section_____.
 - (5) Painting: Section_____.

1.02 System Description

- A** Interior wall system: Fully relocatable and point accessible. System consists of a framing system that will accept metal-faced and gypsum panels. Metal-faced and gypsum panels are interchangeable and may be applied adjacent to each other. System also provides door and glass frames, trims and base.

1.03 Quality Assurance

- A** Wall system components shall be sourced from one manufacturer which certifies that materials meet or exceed these specifications.
- B** Installing contractor: Installer shall have a history of completed jobs of similar size and scope. Contractor shall be registered and authorized by the manufacturer.

- C** Sound transmission: Provide independent laboratory certification that wall system provides:
- _____STC gypsum partitions, and
 - _____STC metal-faced partitions in accordance with ASTM E90.
- D** Fire protection: When required on drawings, provide independent laboratory certification that wall system has been successfully tested for 1-hour fire endurance and hose-stream in accordance with ASTM E119.
- E** Structural: Provide transverse load rating and impact resistance tests. Metal-faced panels shall be capable of supporting 1,000-lb. shelf load within the span of one panel without fastening standards to the framing system.
- 1.04 Submittals**
- A** Samples: Submit finish and color samples.
- B** Manufacturer's data called for in quality assurance section and finish performance data per Section 2.02B.
- C** The partition contractor shall submit shop drawings for assemblies or conditions not fully described on working drawings.

1.05 Environmental Conditions

- A** Temperature within the building shall be above a constant minimum of 65°F with relative humidity not over 70% during erection of a partition. When required, heat shall be furnished by the general contractor. Erection of the partition systems shall not begin until building exterior provides complete protection from the outside weather. Panels shall not be stored where they are subjected to temperature, moisture or humidity extremes.

1.06 Delivery, Storage and Handling

- A** Prefinished materials shall arrive at job site in their original unopened cartons or other protective packaging necessary to protect finishes. Materials should be stored in such packages until time of application. Bulk items (studs and tracks) shall arrive in banded bundles for ease of handling and distribution. Panels shall arrive and remain on adequate support to ensure flatness and prevent damage.

Part 2—Products

2.01 Manufacturer

- A** DONN High Performance Wall System as manufactured by USG Interiors, Inc., Chicago, IL.

2.02 Materials

A Framing:

- (1) Studs shall be 2" deep as indicated on drawings, punched for utility passage, and designated to accept metal-faced or gypsum panels. Studs shall lock to ceiling runner with a stud extender that allows up to 1½" in floor variation.
- (2) Spacer channels shall be designed to lock studs in place, support electrical devices, carry power for signal cables, and provide abuse resistance for the panel surface.

- (3) Ceiling track shall be designed to stabilize the wall at the ceiling, cover the tops of the panels, and integrate with full-height door and glass framing.

B Panels:

- (1) Gypsum panels shall be ½" x 48" or ⅝" x 24", 30" or 48". Panels shall be predecorated in manufacturer's standard vinyl or fabric. Panels shall be bevel-edged for uniform joint appearance.
- (2) Metal-faced panels:
 - (a) Metal-faced panels shall be ½" or ⅝" thick by 24" or 30" wide with gypsum core, plain-backed.
 - (b) Metal-faced panels shall be available in the following finishes:
 - (1) Painted
 - (2) Vinyl
 - (3) Porcelain chalkboard
 - (4) Stainless steel
 - (5) Fabric
 - (c) Finish performance data per the following schedule shall be made available prior to bid:
 - (1) Hardness (ASTM D3363)
 - (2) Adhesion (ASTM D3359)
 - (3) Scratch resistance (Hoffman)
 - (4) Abrasion resistance (ASTM D658)
 - (5) Impact resistance (ASTM D2794)
 - (d) Metal-faced panel shall incorporate a panel bottom channel to add strength and to secure snap-on base.

C Glazing:

- (Option #1): Flush aluminum modular glazing units shall be modular and interchangeable with solid panels. Units shall incorporate leveling devices to accommodate up to 1½" in floor variation. Clerestory, sidelite, chair rail and full-height glazing, with or without chair rail configurations, shall be available.
- (Option #2): Throated steel glazing components shall be available to be installed without regard to module.

D Door frames:

- (Option #1): Flush aluminum door frames shall be available in full-height, or non-full-height configurations. Full-height door frames shall be mortised for two pair of 4½" x 4½" butt hinges and standard A-115.1 strike unless otherwise noted on drawings. Flush frames may be used in on-module or off-module conditions. Non-full-height frames shall be mortised for 1½" pair of 4½" x 4½" butt hinges and standard A-115.1 strike unless otherwise noted on drawings.
- (Option #2): Throated steel door frames shall be available to be installed without regard to module. In the 6'8" and 7'0" configuration, frames shall be nonhanded, reversible, and carry a 1-1½-hour Class B fire rating. Throated door frames shall have achieved a slam test of one million cycles. Throated frames shall be formed of steel. Frames shall be mortised for 1½" pair of 4½" x 4½" butt hinges and standard A-115.1 strike unless otherwise noted on drawings. Full-height frames shall interface with ceiling runner and be mortised for two pair of 4½" x 4½" butt hinges.

- E** Glazing and door frames shall be prefinished in manufacturer's standard color.

- F** Snap-on vinyl base shall be 3¾" high. Color of base shall be from manufacturer's standard colors.

G Trims:

- (1) Trims shall be selected from manufacturer's standard paint colors.
- (2) Outside corners shall be available in square-edge or radiused configurations to match panel finish.

Part 3—Execution

3.01 Inspection

- A** Before stocking or installing materials, the contractor should inspect the building site to verify that floors and ceilings contain no defects which would result in a poor installation of the wall system. At this time, floor-to-ceiling measurements should be taken at enough points to ensure correct installation of full-height frames.

3.02 Installation

- A** Install partition framing and panels after floor coverings and suspended acoustical ceilings have been installed. Coordinate partition work with work of other trades which in any way affect partition installation. Avoid damage to installed work.
- B** Furnish and install anchoring devices required, and secure partitions to floor and ceiling using concealed fastening devices which will not mar surfaces, such as clips and VELCRO® or foam tapes. Penetrating fasteners required only at door frames, finished ends, corners, glazing or where structurally necessary.
- C** Install partitions rigid, level, plumb and in alignment with all components secured together, in accordance with manufacturer's instructions. Leave partitions complete, thoroughly clean, and in perfect condition.
- D** Provide through posts to ceiling or other concealed supports, if required to assure lateral stability of partition runs.
- E** Adjust hardware and leave doors in proper operating condition.

For more information on these products contact: USG Interiors, Inc., 101 S. Wacker Drive, Chicago, IL 60606-4385, or telephone one of these sales offices:

Area Sales Offices:

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Interiors from every angle.™

USG Interiors, Inc.

101 South Wacker Drive
Chicago, Illinois 60606-4385

SA-1020/1-91 Printed in U.S.A.

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DONN[®]

Access

Floor

Systems

USG Interiors, Inc.



USG



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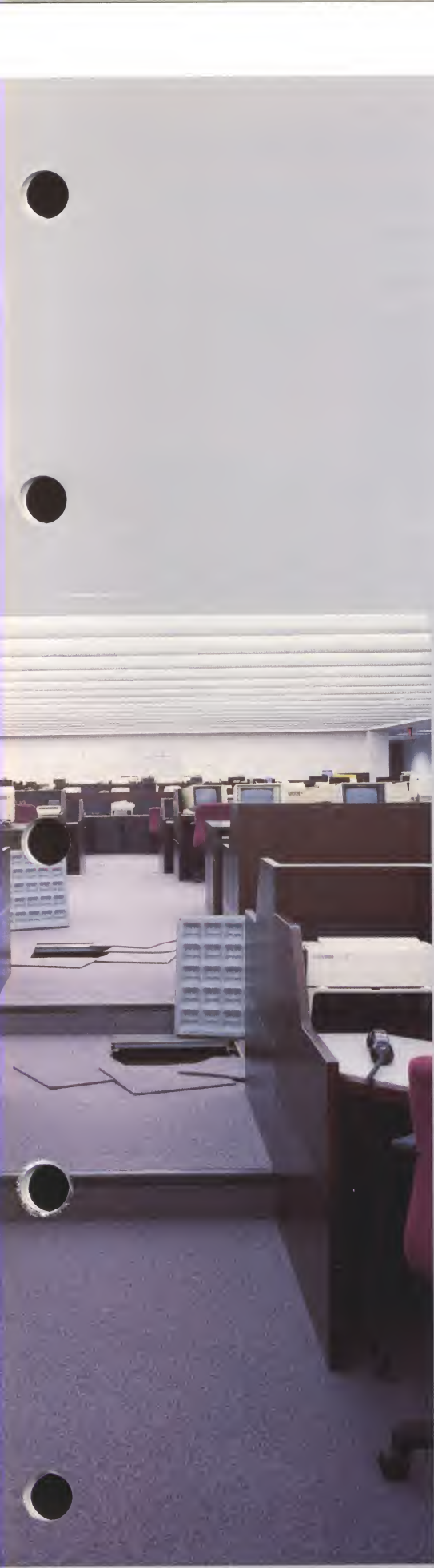
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FLOORS THAT SUPPORT TODAY'S BUSINESS

ENVIRONMENT DONN Access Floors deliver the flexibility required to keep up with today's technological advances. What's more, they're built to meet your specific design requirements, from load bearing strength and utility maintenance to chemical/corrosion resistance and air flow.

Many different DONN Access Floor Systems are available for office buildings, computer rooms and clean rooms. This publication is designed to help you select the system best suited to each application.

DESIGNAID COST ANALYSIS This computerized cost comparison program analyzes true costs for access floors versus costs for underfloor duct, cellular deck, flat wiring, powerpoles and other wiring distribution systems. It also compares mechanical ductwork costs for ceiling air distribution versus the cost of underfloor air distribution. Using your figures (for both systems under consideration) it calculates material, labor and installed costs, depreciation, tax credits and move costs, cash flow and total life cycle costs for both systems. The program also supplies complete scale drawings of the proposed floor systems, including all components, accessories, wiring patterns and enlargements of pertinent details.

USG INTERIORS, INC. USG Interiors is one of the world's largest commercial interior construction products companies. Continuing a tradition of superior products, systems and customer service, USG Interiors brings inventive, exciting offerings for ceilings, walls and floors.

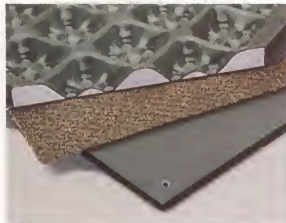
DONN Access Floor Systems, along with USG Interiors wall and ceiling systems, are displayed at the National Showroom in Long Island City, New York, and the Solutions Center in Chicago, Illinois.

WIRING DISTRIBUTION SYSTEMS THAT CAN GROW WITH YOUR BUSINESS Access floor systems are the ideal choice for new or renovated office space. They conceal and manage cables, wires and other services, yet remain flexible enough to adapt quickly and easily to changing furniture and equipment layouts. Access floors allow office space to be rearranged with minimal disruption and expense, by in-house personnel, over the lifetime of a building.

SOLIDFEEL II Panel (24" x 24") System

Recommended for high-traffic areas, heavy rolling loads. Features exceptional strength, extra resistance against deformation.

- Improved structural and acoustical performance for quiet comfort and a solid, rigid feel underfoot.

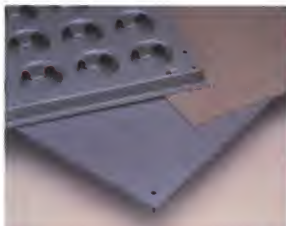


- Improved rolling load performance from lightweight cementitious core material.
- Panel precision-formed into a pattern of 25 square pockets with additional support structures.
- Unitized panel construction for maximum strength; each panel welded in 160 locations for improved performance.
- Durable, conductive epoxy paint finish resists abrasion and dissipates static electricity.
- Interchangeable with All-Steel panel (check panel height variations).

All-Steel Panel (24" x 24") System

Meets normal load requirements; lighter weight; easy to install and reconfigure.

- Economical high performance and strength.



- Each panel welded in 140 locations for improved load resistance, efficient dispersal of load.
- Durable, conductive epoxy paint finish to resist abrasion and dissipate static electricity.
- Interchangeable with SOLIDFEEL II panel (check panel height variations).

SOLIDFEEL II Selection Guide

System	Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Rated Impact Load (Lbs.)	Recommended Finished Floor Height
Intermediate Loads						
SF-1000	CORNERLOC	800	1000	3000	125	Up to 24"
SF-1000	FreeStanding	800	1000	3300	125	Up to 18"
SF-800	CORNERLOC	600	800	2300	100	Up to 24"
SF-800	FreeStanding	600	800	2400	100	Up to 18"
Heavy Loads						
SF-1250	CORNERLOC	1000	1250	3200	150	Up to 24"
SF-1250	FreeStanding	1000	1250	3400	150	Up to 18"
Extra-Heavy Loads						
SF-1500	CORNERLOC	1200	1500	3500	175	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards. For higher finished floor heights, contact USG Interiors.

All-Steel Selection Guide

System	Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Rated Impact Load (Lbs.)	Recommended Finished Floor Height
Intermediate Loads						
AS-1000	CORNERLOC	400	1000	2600	100	Up to 24"
AS-1000	FreeStanding	400	1000	3000	100	Up to 18"
Heavy Loads						
AS-1250	CORNERLOC	500	1250	2800	110	Up to 24"
AS-1250	FreeStanding	500	1250	3500	110	Up to 18"
Extra-Heavy Loads						
AS-1500	CORNERLOC	600	1500	3000	120	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards. For higher finished floor heights, contact USG Interiors.

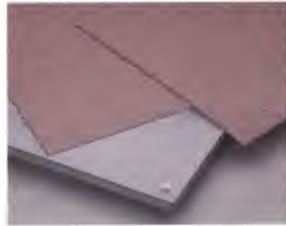
To use the Selection Guide, analyze the structural performance needed for your project; then select the combination of panel and understructure that achieves the required values.

Wood-Lok Panel (24" x 24") System

Most economical solution to access floor requirements.

- Lightweight construction: galvanized steel completely encases high-grade particleboard core for deflection resistance, quiet comfort.
- Meets Class A fire rating per ASTM E84.

- Each panel locked to pedestal head at all four corners for lateral stability.



Wood-Lok Selection Guide

System	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Rated Impact Load (Lbs.)	Recommended Finished Floor Height
Panel Understructure					
WL-1000 WOOD-LOK	600	1000	2000	120	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards. For higher finished floor heights, contact USG Interiors.

Understructures

CORNERLOC Understructure

Mechanically fastens each floor panel to a pedestal at all four corners, ensuring rigidity, lateral stability.

- Fasteners securely lock down panels; provide firmness and quiet comfort.
- Gravity-lock collar on pedestal assures system levelness.
- Recommended for finished floor heights from 6" to 24".



Wood-Lok Understructure

Secures each floor panel directly to pedestal with four corner fasteners. Provides a quiet, stable system.

- Gravity-lock collar on pedestal assures system levelness.
- Recommended for finished floor heights from 6" to 24".



FreeStanding Understructure

Provides easier access to the underfloor plenum. Special trapezoid-shaped flanges of the pedestal head hold panels in place and provide panel edge support—assures rigidity and quiet performance.

- Die-cast aluminum pedestal head.
- Gravity-lock collar on pedestal assures system levelness.
- Recommended for finished floor heights up to 18".



Office Systems for Seismic Applications

Understructure Pedestal Base Assembly	Seismic Zones 0, 1, 2A, 2B	Seismic Zone 3	Seismic Zone 4
CORNERLOC or WOOD-LOK 1" diameter tube 4"x4"x1/8" baseplate	6"-24" finished floor height	6"-20" finished floor height	6"-16" finished floor height
FreeStanding 1" diameter tube 4"x4"x1/8" baseplate	6"-18" finished floor height	6"-12" finished floor height	6"-12" finished floor height

Based on UBC Code-1988 for general office applications. For higher finished floor heights and other code requirements, contact USG Interiors.

AIR DISTRIBUTION SYSTEMS Accessible underfloor air distribution is an excellent way to provide environmental control factors such as air conditioning, humidity control and ventilation, which are critical to higher levels of comfort and increased productivity for office workers. Benefits include:

- Uniform air delivery
- Economical construction
- Improved air quality
- Reduced drafts
- Fast installation
- Easy maintenance

For airflow data, refer to the DONN Air Distribution Control Plenum System catalog, SA-1029, in Section 10270 of Sweet's Mechanical Engineering and Retrofit File.

Interior Zone Applications *Krantz KB-200 Diffuser*

Material—All components are high-impact polycarbonate Makrolon #94-15 manufactured by Mobay Chemical Co.

Compliance—Injection-molded, self-extinguishing material complies with UL-94 and ASTM D635-74 criteria.

Color—Standard: light gray. Other colors are available to match or complement carpet tile colors and patterns.

Outlets—Floor outlets feature angular slots that twist air exiting the diffuser in a radial fashion to achieve a high 6 to 1 induction rate.

Air Temperature—Plenum supply air may be introduced into the room at 62-65°F for air conditioning versus 55-58°F for ceiling diffusers.

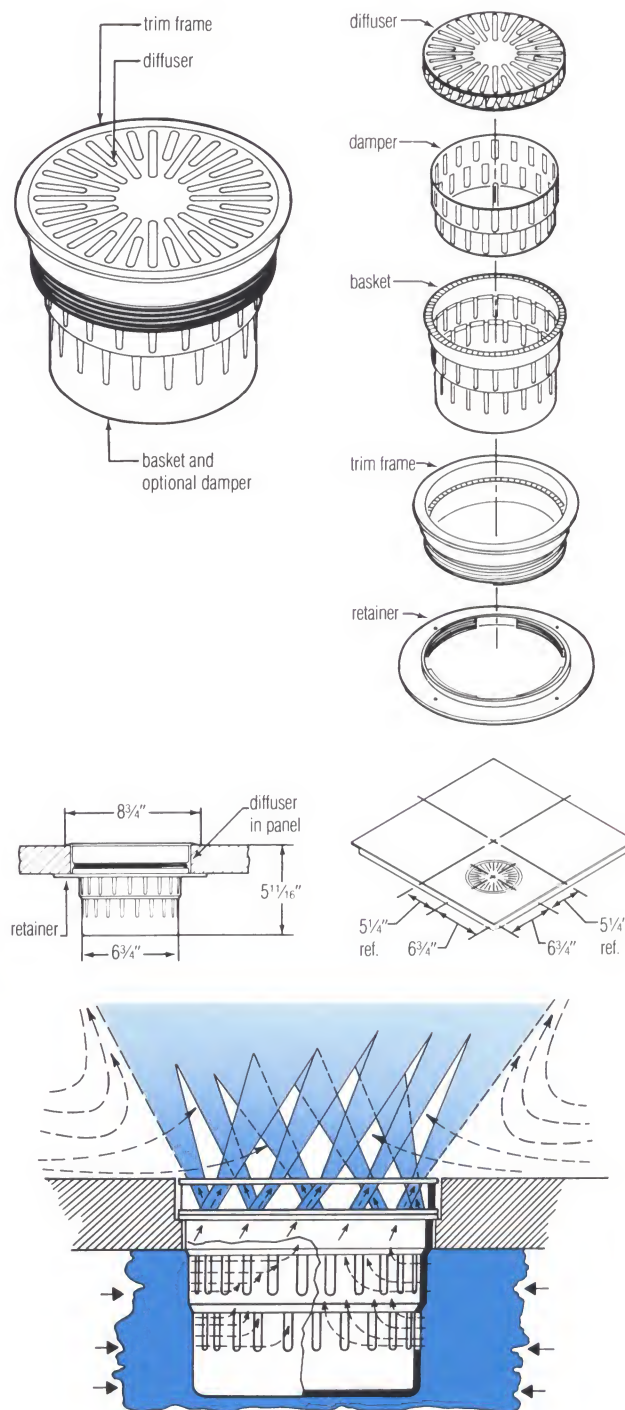
Air Flow—Air flow per KB-200 diffuser outlet can vary from 75 to 100 cfm depending on static pressure within the Control Plenum System.

Damper—An optional damper is readily installed within the basket for additional air control.

Maintenance—Assembly includes the radial angular slot diffuser together with a dirt-collecting basket that can be easily removed for cleaning.

Installation

1. Panel can be supplied with factory cutout at location shown in drawing. Field cutout size for KB-200 diffuser: $8\frac{5}{16}$ " dia. $\pm \frac{1}{32}$ ".
2. Trim frame is placed in cutout and secured to panel with retainer.
3. Panel assembly is installed in floor.
4. Basket, damper (optional) and diffuser are inserted into outlet.

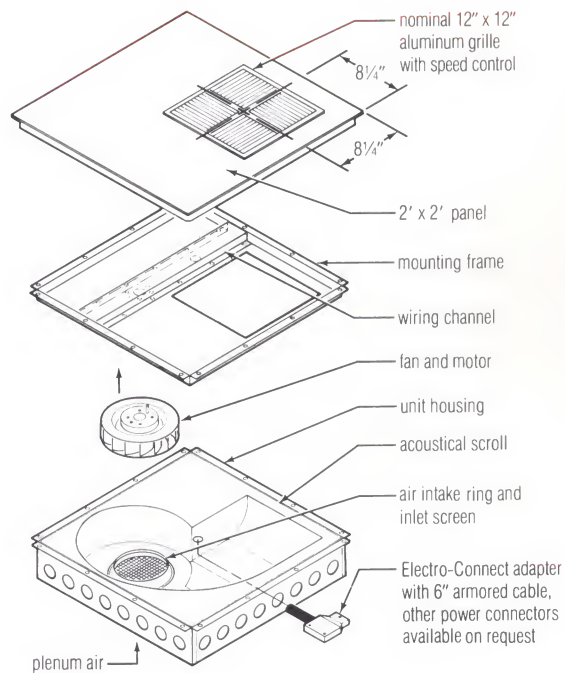
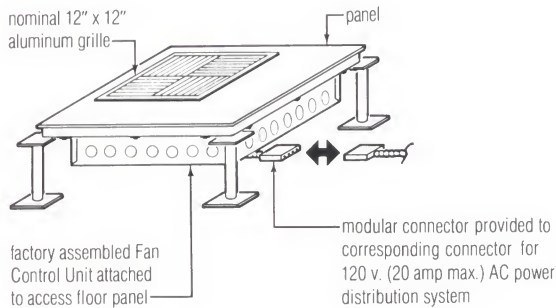


DONN Fan Control Unit with Aluminum Grille 4-Way Diffuser

Application of Fan Control Units with Square 4-Way Air Grille

For interior zones with varying thermal conditions, such as workstations and/or conference rooms. Built-in fan speed control can be adjusted from top of panel for additional comfort control.

Thermostat Accommodation (optional)—Up to 10 Fan Control Units may be grouped together electrically and controlled by a centralized thermostat.



Perimeter Zone Applications

Application of Fan Control Units with Linear Air Grille For perimeter zones having high and/or variable thermal conditions. Designed for SOLIDFEEL II and WOOD-LOK panel/systems.

Installation

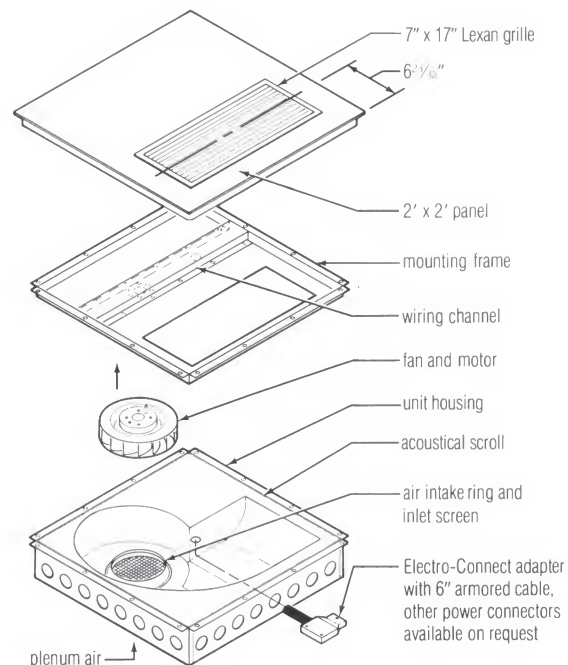
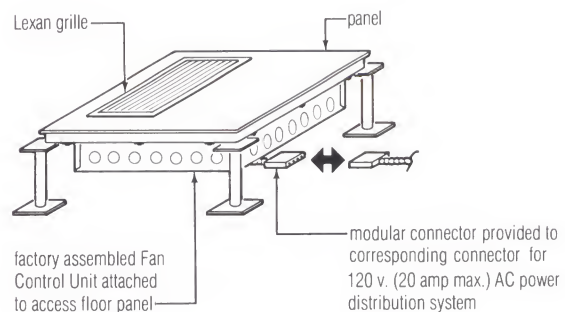
1. Fan Control Units are provided factory-installed to appropriate 24"x24" DONN access floor panels. They are shipped to jobsite as a complete assembly.
2. Keep underside of Fan Control Unit (max. 5 7/8" depth) free of any obstructions. Maintain minimum 2" vertical space between subfloor and inlet.
3. Connect factory installed ELECTRO/CONNECT® adapter for 120-volt AC power supply to flexible wiring system. Other adapter/connectors are available.
4. Install complete assembly into access floor system.

Components

Housing—Galvanized steel housing is attached to underside of panel with 12#8x1/2" hex washer-head self-drilling screws.

Fan Assembly—45-watt, 115-volt, 1500-rpm motor powers a backward-curved impeller fan that is shielded by inlet screen. Fan assembly is secured to mounting frame.

Power Connector—Unit is provided with modular wiring adapter for ease of installation and relocation. The external adapter is connected by branch cable to 120-volt/20-amp AC power supply.



WIRING DISTRIBUTION SYSTEMS/SERVICENTER OUTLETS SERVICENTER outlets bring all electrical and data communication services from the control plenum to the work area for user convenience. These outlets and related panels can be quickly installed or moved by in-house personnel as needed. Four types of SERVICENTER outlets meet specific performance and budget requirements.

For more information, refer to the DONN Wiring Distribution Control Plenum System catalog, SA-1028, in Section 10270 of Sweet's Electrical Engineering and Retrofit File.

Double Lid/Box Specification Grade SERVICENTER

Double lid version of expanded box accommodates additional electrical, data, and telecommunication services.

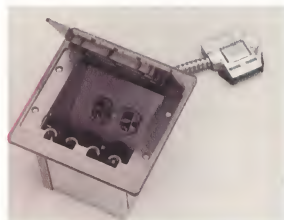
- Two compartments and lids to separate power and communication services.
- Or, both compartments available to accommodate four 20 amp/120V duplex receptacles.
- Accommodates 6" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN lids snap off for easy maintenance.



Specification Grade SERVICENTER

The most versatile box for electrical and telecommunication needs.

- Can be factory-wired with modular wiring (UL listed E 63807) or field-wired with metal-clad or armored cable (UL listed E 75945).
- Modular wiring connections at box allow quick, easy relocation. ELECTRO/CONNECT system is standard; other wiring systems are available.
- Interface plates accommodate electrical and local area networking (LAN).
- Two 20 amp/120V duplex receptacles are standard.
- One- or two-circuit wiring is available.
- Accommodates 6" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN lid snaps off for easy maintenance.



Commercial Grade SERVICENTER

Can be used with SERVICENTER Specification Grade to separate power and communication services; can also be used as a compact box for electrical or telecommunication needs.

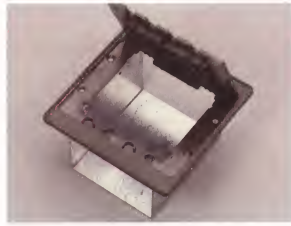
- Can be factory-wired with modular wiring (UL listed E 63807) or field-wired with metal-clad or armored cable (UL listed E 75945).
- Modular wiring connections at box allow quick, easy relocation. ELECTRO/CONNECT system is standard; other wiring systems are available.
- Provided with two interface plates for mounting of data cables.
- One 20 amp/120V duplex receptacle is standard.
- One- or two-circuit wiring is available.
- Accommodates 4" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN lid snaps off for easy maintenance.



SERVICENTER Component Assembly

Provides economical unit for 120V service and pass-through wiring.

- Wrapper assembly accepts standard 4"-square junction box for field wiring.
- Accommodates 6" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN lid snaps off for easy maintenance.



Accessories

LEXAN Plastic Grille One-piece, molded grille in gray color, ideal for carpeted panels.

- Electrically nonconductive material eliminates need for isolation band used with metal grilles.



- LEXAN 500—UL fire-rated, test method 94 V-O.
- Supports rolling and concentrated loads up to 1000 lbs.
- 51 sq. in. open area for improved air volume.
- Six manually adjusted dampers for airflow control.

AMP Access Floor Workstation Module

Ergonomic design features flip-up lid for carpet insert and panel board that will accommodate above floor access to connections.

- Wiring, faceplates and other components are interchangeable.
- Provides accessibility for installation and connection, moves, changes, repair and maintenance.
- Adaptable to field installed wiring or manufactured wiring systems.
- Maximizes attributes of standard power, twisted pair, coax, fiber and video products.
- Provides isolation grounding for all networking products.

- Supports all IEEE 802, CCITT/ISDN and ANSI industry standard systems.
- Meets requirements of UL and approval agencies.



Cutout Cable cutouts for wiring access can be either factory-supplied or field-cut and trimmed.

Grommet Heavy-duty 4½"-diameter plastic grommets prevent damage to wires pulled through cutouts.



Panel Lifters Easy lifting of panels from under-structure.

- Double Cup for HPL panels.
- Double Pin Lifter for carpet-covered panels.

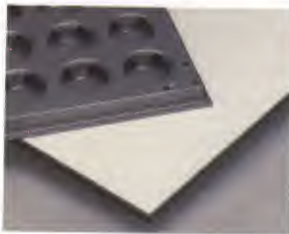


ACCESS FLOOR SYSTEMS THAT CAN BE TAILORED TO PRECISE COMPUTER ROOM REQUIREMENTS—TOGETHER WITH DESIGNER INTEGRAL TRIM DONN access floor systems from USG Interiors stand up to heavy rolling loads of computer paper and electrical equipment plus various levels of concentrated loads. They help expedite upgrading, rearrangement and repair of computer equipment and services. They also control air distribution and conceal and manage cables, wires and other services. DONN access floor systems can be custom designed to place panels with different load characteristics exactly where they are needed within the same understructure. Rigid Grid systems for computer rooms provide an exceptionally high degree of stability and accessibility.

All-Steel Panel (24" x 24") System

Recommended for all computer room applications. Lighter weight; cuts easily. Ideal for cable cutouts.

- Each panel welded in 140 locations for improved load resistance, efficient dispersal of load.



- Offered with patented Integral Trim machined from the HPL panel surface, for a stronger, more permanent edge. Won't crack, chip or fall off like add-on trim. Finer module line half the width of add-on trim, for improved visual appeal.
- Durable, conductive epoxy paint finish to resist abrasion and dissipate static electricity.
- Interchangeable with SOLIDFEEL II panels (check panel height and covering variations).

To use the Selection Guide, analyze the structural performance needed for your project; then select the combination of panel and understructure that achieves the required values.

All-Steel Selection Guide

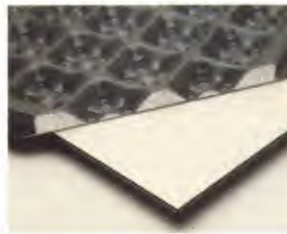
System	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Rated Impact Load (Lbs.)	Recommended Finished Floor Height
Panel Understructure					
Intermediate Loads					
AS-1000 Edge Support Rigid Grid	400	1000	4000	100	Up to 36"
AS-1000 SNAP-LOC	400	1000	3100	100	Up to 24"
AS-1000 FreeStanding	400	1000	3000	100	Up to 18"
Heavy Loads					
AS-1250 Edge Support Rigid Grid	500	1250	4500	110	Up to 36"
AS-1250 SNAP-LOC	500	1250	3800	110	Up to 24"
AS-1250 FreeStanding	500	1250	3500	110	Up to 18"
Extra-Heavy Loads					
AS-1500 Edge Support Rigid Grid	600	1500	4700	120	Up to 36"
AS-1500 SNAP-LOC	600	1500	4000	120	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards. For higher finished floor heights, contact USG Interiors.

SOLIDFEEL II Panel (24" x 24") System

Exceptionally strong, extra resistance against top sheet deformation. Recommended for high-traffic areas, heavy rolling loads in conjunction with All-Steel panels.

- Complete product line includes extra heavy-duty system consisting of SF-2000 panel with Edge Support Rigid Grid understructure and heavy-duty pedestal assembly.



- Improved structural and acoustical performance.
- Steel panel filled with lightweight cementitious core material, for improved rolling load performance.
- Unitized panel construction for maximum strength; each panel welded in 160 locations for improved load resistance.
- Durable, conductive epoxy paint finish resists abrasion and dissipates static electricity.
- Interchangeable with All-Steel panels (check panel height and covering variations).

SOLIDFEEL II Selection Guide

System	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Rated Impact Load (Lbs.)	Recommended Finished Floor Height
Panel Understructure					
Intermediate Loads					
SF-1000 Edge Support Rigid Grid	800	1000	3500	125	Up to 36"
SF-1000 SNAP-LOC	800	1000	3400	125	Up to 24"
SF-1000 FreeStanding	800	1000	3300	125	Up to 18"
Heavy Loads					
SF-1250 Edge Support Rigid Grid	1000	1250	4200	150	Up to 36"
SF-1250 SNAP-LOC	1000	1250	3500	150	Up to 24"
SF-1250 FreeStanding	1000	1250	3400	150	Up to 18"
Extra-Heavy Loads					
SF-1500 Edge Support Rigid Grid	1200	1500	5000	175	Up to 36"
SF-1500 SNAP-LOC	1200	1500	4000	175	Up to 24"
SF-2000 Edge Support Rigid Grid	2000	2000	6000	200	Up to 36"

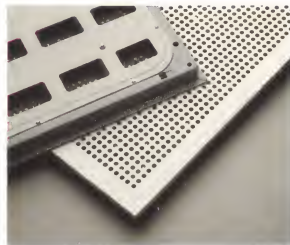
Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards. For higher finished floor heights, contact USG Interiors.

Tuf-Flo II Panel (24" x 24") System

Interchangeable with All-Steel panels to provide high-capacity airflow for computer room applications.

- 25% open area for maximum airflow and low noise levels.
- Symmetrical pattern.
- Optional galvanized damper for easy airflow adjustment from top of panel.
- Unitized panel construction for high structural performance.

- Available in 1,000 lb. and 1,250 lb. concentrated load ratings (check panel height and covering variations).



Tuf-Flo II Perforated Panel

Static Pressure (Inches of H ₂ O)	.05	.075	0.1	0.15	0.2
CFM* with Damper	380	466	540	660	762
CFM* without Damper	510	625	722	885	1022

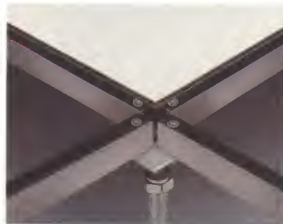
*Cubic feet per minute. ETL-certified test data.

Understructures

Edge Support Rigid Grid Understructure Withstands high lateral forces caused by intermittent starting and stopping of heavy rolling loads.

- Available in 2'x2', 2'x4', and 4'x4' basket-weave configurations.
- Factory-applied gasket on stringer gives tighter seal and improved sound control.

- Gravity-lock collar on pedestal assures system levelness.
- Continuity clips provide less than 10 ohms resistance between panel and understructure for safety and system conductivity.

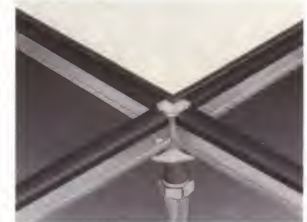


SNAP-LOC Understructure

Recommended for less severe concentrated and rolling load applications.

- Stringers snap on and off without tools; stringer covers provide improved sound control.
- Gravity-lock collar on pedestal assures system levelness.

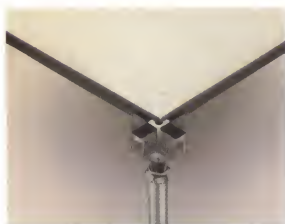
- Recommended for finished floor heights up to 24".



FreeStanding Understructure

Provides easier access to the underfloor plenum. Special trapezoid-shaped flanges of the pedestal hold panels in place and provide panel edge support.

- Die-cast aluminum pedestal head.
- Gravity-lock collar on pedestal assures system levelness.
- Recommended for finished floor heights up to 18".



Computer Room Systems for Seismic Applications

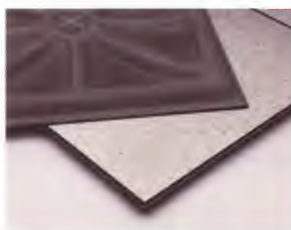
Understructure Pedestal Base Assembly	Seismic Zones 0, 1	Seismic Zone 2A	Seismic Zone 2B	Seismic Zone 3	Seismic Zone 4
Edge Support Rigid Grid 1" diameter tube 4"x4"x1/8" baseplate	6"-30" finished floor height	6"-28" finished floor height	6"-22" finished floor height	6"-15" finished floor height	6"-12" finished floor height
Edge Support Rigid Grid 1 1/8" swaged tube 5"x5"x1/8" baseplate	31"-36" finished floor height	29"-36" finished floor height	23"-34" finished floor height	16"-28" finished floor height	13"-24" finished floor height
Edge Support Rigid Grid 1 1/2" swaged tube 6"x6"x3/16" baseplate	N/A	N/A	35"-36" finished floor height	29"-36" finished floor height	25"-36" finished floor height

Based on UBC Code-1988 for computer room applications. For higher finished floor heights and other code requirements, contact USG Interiors.

Mark 30 Panel (24" x 24") System

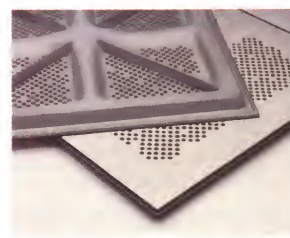
The traditional choice for computer room access floor panels.

- Unique, self-contained, mechanically locked edge trim with fitted corner treatment.
- Strong, lightweight, all steel construction.
- Radial rib design.
- Durable, conductive epoxy paint finish to resist abrasion and dissipate static electricity.

**Mark 30 Perforated Panel (24" x 24")**

Interchangeable with solid Mark 30 panel.

- Unique, self-contained, mechanically locked edge trim with fitted corner treatment.
- Optional galvanized damper for easy airflow adjustment from top of panel.
- 1,000 lb. concentrated load rating.

**Mark 30 Selection Guide**

Panel	System Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Rated Impact Load (Lbs.)	Recommended Finished Floor Height
Heavy Loads						
MK-1250	Mark 30 Rigid Grid	500	1250	2500	120	Up to 36"
MK-1250	Mark 30 SNAP-LOC	500	1250	2500	120	Up to 24"
Extra-Heavy Loads						
MK-1500	Mark 30 Rigid Grid	600	1500	3000	120	Up to 36"
MK-1500	Mark 30 SNAP-LOC	600	1500	3000	120	Up to 24"

WOOD-COR PANEL (24" x 24") System

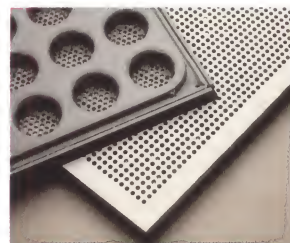
Most economical solution to access floor requirements of computer rooms.

- Galvanized steel completely encases wood particleboard core for improved load performance.
- Meets Class A fire rating per ASTM E84.
- Provides excellent insulation and sound qualities for user comfort.
- Mechanically locked edge trim with fitted corner treatment.

**Perforated Air Panel (24" x 24")**

Interchangeable with solid WOOD-COR panel.

- 25% open area for maximum airflow and low noise levels.
- Optional galvanized damper for easy airflow adjustment from top of panel.
- 1,000 lb. concentrated load rating.
- Mechanically locked edge trim with fitted corner treatment.

**Wood-Cor Selection Guide**

Panel	System Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Rated Impact Load (Lbs.)	Recommended Finished Floor Height
Intermediate Loads						
WC-1000	WOOD-COR Rigid Grid	800	1000	3400	120	Up to 36"
WC-1000	WOOD-COR SNAP-LOC	600	1000	2200	120	Up to 24"
WC-1000	WOOD-COR FreeStanding	600	1000	2000	120	Up to 18"

To use the Selection Guide, analyze the structural performance needed for your project; then select the combination of panel and understructure that achieves the required values.

Understructures

Mark 30 Rigid Grid Under-structure Bolted stringers of 6' and 2' lengths improve lateral stability.

- 2' stringer cover adds sound control and provides an air seal between panel and stringer.
- Gravity-lock collar on pedestal assures system levelness.

- Continuity clips provide less than 10 ohms resistance between panel and under-structure for safety and system conductivity.



Wood-Cor Rigid Grid Under-structure Bolted stringers of 6' and 2' lengths improve lateral stability.

- Also, available with all 2' stringers.
- Gravity-lock collar on pedestal assures system levelness.

- Stringers support panels along their entire perimeter; are covered with conductive vinyl to provide panel alignment and sound control.



Wood-Cor SNAP-Loc Under-structure Designed for less severe concentrated and rolling load applications.

- Roll-formed galvanized steel stringers in 2' lengths with vinyl covers for sound control and panel alignment.
- Gravity-lock collar on pedestal assures system levelness.

- Spring-action connection on pedestal cap allows stringers to connect without fasteners and to be removed quickly without tools.



Mark 30 SNAP-Loc Under-structure Designed for less severe concentrated and rolling load applications.

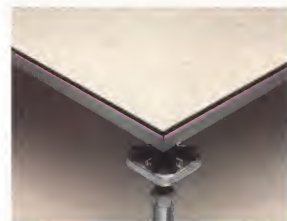
- Spring action connection on die-cast aluminum pedestal cap allows stringers to connect without fasteners and to be removed quickly without tools.
- Gravity-lock collar on pedestal assures system levelness.

- 2' stringer cover adds sound control and provides an air seal between panel and stringer.



Wood-Cor FreeStanding Understructure Designed for finished floor heights below 18".

- Pedestal head with panel locating tabs.
- Gravity-lock collar on pedestal assures system levelness.
- Stringerless pedestals for fast, easy access.

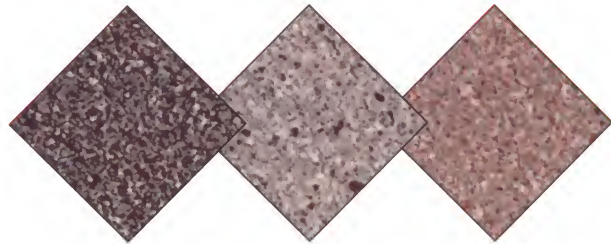


Designer Integral Trim Static-control High Pressure Laminate (HPL) with patented Integral Trim comes in five designer color patterns.

Integral Trim is machined from the HPL itself, eliminating the need for separate pieces, to give a stronger, more permanent edge. Integral Trim won't crack, chip or fall off like add-on trim. Plus its finer module line is half the width of add-on trim, for improved visual appeal.

Integral trim HPL has the same electrical performance as DONN HPL.

DONN HPL Patterns with Designer Integral Trim



Constellation

Misty

Sandpiper



Greystone

Beigestone

DONN Static-Control HPL Coverings DONN HPL surfaces, in seven standard patterns, provide high wear resistance, efficient static control and attractive appearance. They meet major computer industry surface to ground resistance specifications (5×10^5 ohms min. to 2×10^{10} ohms max.). Two thickness, $\frac{1}{16}$ " and $\frac{1}{8}$ ", are available; $\frac{1}{16}$ " recommended for most applications, offer cost savings without compromising wear, appearance or performance.

UNTRIM protective edging is sonically welded for durability.

DONN HPL Patterns with UNTRIM



Grey Matrix

Beige Matrix

Grey Kontrac



Beige Kontrac

Whitestone

Greystone

Beigestone

Static Conductive HPL Coverings These coverings are constructed with special built-in materials for static-conductive surfaces required in clean rooms and other high-technology areas. They meet NFPA Standard 99, which requires surface to ground resistance from 2.5×10^4 ohms min. to 1×10^6 ohms max. Static decay rate as measured by Federal Test Method 101, Method 4046, is .05 seconds or less.



Off White

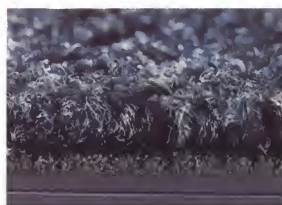
These color reproductions show colors that are close as possible within printing limitations to actual products. For actual production material, see HPL sample chips offered by your USG Interiors representative. For additional technical information on laminate floor coverings, contact your USG Interiors representative or call 1-800-522-3666.

Carpeting DONN access floor panels are offered with laminated, factory-applied carpet in two designs, MEGATREND CG multilevel loop pile and 3500 CG cut pile. EDGELOC urethane unitary backing on both styles prevents carpeting from unraveling at panel edges. Carpet is provided by J&J Industries in six standard colors. Carpeted panels come without edge trim for a monolithic appearance.

Both carpet designs have been performance-tested for heavy-duty commercial applications. MEGATREND CG is made of CAMALON® yarn, designed for heavy wear and easy maintenance. It is ideally suited for areas subject to heavy traffic and dirt. MEGATREND CG is solution-dyed for superior color fastness in unlimited dye lot sizes. 3500 CG is made of 100% COMMERCIALON®, designed for superior bulk and resiliency as well as easy maintenance. It is Beck-dyed for color consistency. Both CAMALON and COMMERCIALON yarns are soil-hiding, advanced-generation nylon with a 10-year warranty.

MEGATREND CG and 3500 CG are static-dissipative carpets designed for electronically sensitive applications such as modern electronic offices, control rooms and computer rooms. Carpeting meets major computer industry surface resistance specifications; assures 2.0 kV or less static generation as tested under AATC-134-1979. Carpeting also has passed NBS Aminco Smoke Chamber test (450 or less) and Radiant Panel Class 1 (institutional, health and commercial) at greater than 0.45 watts/cm².

For technical information and color selections covering J & J Industries and/or other USC approved carpeting, contact your USC Interiors representative or call 1-800-522-3666.



*MEGATREND CG multilevel
loop pile (24 oz.)*



3500 CG cut pile (30 oz.)



ALUMINUM ACCESS FLOOR SYSTEMS FOR CLEAN ROOMS, MRI ROOMS AND OTHER ELECTRO-MAGNETIC EQUIPMENT ROOMS, AND SPECIAL COMPUTER ROOMS

Aluminum access floor systems are designed for MRI rooms and class 10, or cleaner, controlled environments. Nonmagnetic aluminum meets MRI room specifications. For clean rooms, aluminum grate accommodates high-volume laminar airflow to remove particle contaminants. Grating also handles laminar airflow in a continuous cycle of supply air distribution and return. Corrosion- and chemical-resistant aluminum materials protect interior finishes from contaminants. Appropriate for scientific processing environments such as integrated chip manufacturing, biomedical testing, pharmaceutical manufacturing and chemical processing. Panels and understructure offer exceptional stability and accessibility. Heavy-duty pedestals meet load requirements for seismic applications.

Solid Panel (24" x 24") System

Recommended where higher ultimate load ratings are required to support heavy equipment.

- Offered with Conductive High Pressure Laminate (HPL), Static-Control HPL or Conductive Vinyl Tile to meet static control needs.

- Offered with carpet laminated to full size panels without edge trim. Or supplied bare for carpet tile application.
- Trim edge is pressure-inserted and locked in place.
- Interchangeable with grates and perforated panels.



Solid Panel

System			
Panel with FreeStanding Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)
Intermediate Loads			
Aluminum Solid Panel			
AL-1000	850	1000	3200

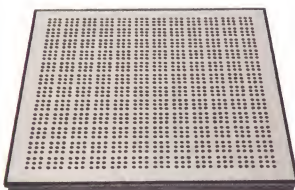
Rated system loads shown are recommended by USG Interiors.

Perforated Panel (24" x 24") System

Allows unobstructed airflow through panel.

- Available with Conductive High Pressure Laminate (HPL), Static-Control HPL or Conductive Vinyl Tile to meet static control requirements.
- Trim edge is pressure inserted and locked in place.

- Optional, field-applied damper is adjustable, slides from fully open to fully closed for complete control of balancing airflow.
- Interchangeable with grates and solid panels.



Perforated Panel

System				Airflow		
Panel with FreeStanding Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Static Pressure (inches of H ₂ O)		
				0.01	0.1	0.2
Intermediate Loads						
Aluminum Perforated Panel						
AL-1000	850	1000	2500	217 CFM	672 CFM	950 CFM

Rated system loads shown are recommended by USG Interiors. Airflow is measured in cubic feet per minute using perforated panels without dampers.

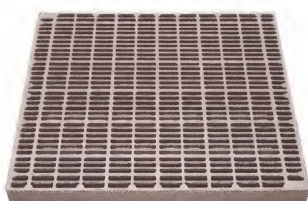
Note: Optional louvered damper is available for *critical* clean room applications.

Grate (24" x 24") System

Meets air handling requirements for Class 10 and lower clean rooms. 60% open area lowers operating costs.

- One-piece die-cast construction allows highest volume laminar airflow and required structural performance.
- Ribs have smooth, contoured top surface for non-abrasive wear and improved comfort.

- Conductive epoxy paint finish formulated without carbon for lowest contaminant exposure.
- Optional, field-applied damper is adjustable, slides from fully open to fully closed for complete control of balancing airflow.



Grate Panel

System

Panel with FreeStanding Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Airflow		
				Static Pressure (inches of H ₂ O)		
				0.01	0.1	0.2

Intermediate Loads

Aluminum Grate AG-1000	850	1000	2300	1400 CFM	4404 CFM	6365 CFM
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Rated system loads shown are recommended by USG Interiors. Airflow is measured in cubic feet per minute using grates without dampers.

Aluminum FreeStanding Understructure

Provides unrestricted access to the underfloor plenum at any point.

- Corrosion-resistant pedestals capable of supporting a 5000-lb. vertical load without permanent deformation.
- Pedestal lugs interlock with corner sockets of panels and grates for secure fit, overall system rigidity and vibration resistance.

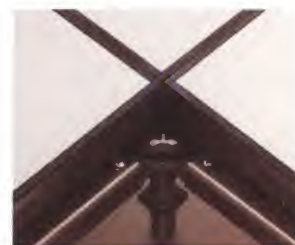
- Conductive pads on each pedestal head provide less than 1 ohm resistance and help deaden sound.



Aluminum Rigid Grid Understructure

Recommended for heavy rolling loads.

- Nonmagnetic all-aluminum construction.
- Available in 2'x2' configuration with 2' stringers only.
- Gravity-lock on pedestal assures system levelness.
- Provides less than 10 ohms resistance between panel and understructure for safety and system conductivity.



Note: Panels also available for CORNERLOC installation with or without stringers.

Clean Room Systems for Seismic Applications

FreeStanding Heavy-Duty Pedestals	Seismic Zones 0, 1	Seismic Zone 2A	Seismic Zone 2B	Seismic Zone 3	Seismic Zone 4
1" diameter aluminum tube	7"-18"	7"-18"	7"-16"	7"-16"	7"-15"
4 1/2" diameter baseplate	finished floor height	finished floor height	finished floor height	finished floor height	finished floor height
1 1/8" diameter aluminum tube	19"-24"	19"-22"	17"-20"	N/A	N/A
4 1/2" diameter baseplate	finished floor height	finished floor height	finished floor height		
1 1/8" diameter swaged steel tube with 5"x5"x1/8" baseplate	25"-36"	23"-30"	21"-28"	17"-27"	16"-24"
	finished floor height	finished floor height	finished floor height	finished floor height	finished floor height
1 1/2" diameter swaged steel tube with 6"x6"x3/16" baseplate	N/A	31"-36"	29"-36"	28"-36"	25"-36"
		finished floor height	finished floor height	finished floor height	finished floor height

Based on UBC Code-1988. For higher finished floor heights and other code requirements, contact USG Interiors.

Detailed specifications for your specific project are available on request. These specifications are computer generated to meet your exact needs. For technical service, call USG Interiors Access Floor Systems at 1-800-522-3666.

In addition, following are typical examples of specifications for office and computer room access floors. For offices, SOLIDFEEL II panels with a CORNERLOC understructure are specified. For computer rooms, All-Steel panels with an Edge Support Rigid Grid understructure are specified.

Part 1—General

1.01 Description of Work

- A** Work in this section includes, but is not limited to: access floor panels, floor coverings, understructure and various electrical, data, communication and structural accessories.
- B** Related work specified elsewhere:
 - 1 Concrete: Division 3.
 - (a) Cast-in-place concrete shall be within 1" of specified height and shall not vary more than 1/4" in 10".
 - (b) Concrete sealer shall be Euco Floor Coat, CLEARBOND® or an approved equal that is compatible with access floor pedestal adhesive.
 - (c) Depressed slab, if specified, shall be compatible with access floor.
 - 2 Finishes: Division 9, reference paragraph 2.02B.
 - (a) Tile: Section 09300.
 - (b) Carpet: Section 09680.
 - 3 Mechanical: Division 15. Assure compatibility of installation details with access floor.
 - 4 Electrical: Division 16. Electrical contractor shall connect access floor to building ground as specified in paragraph 3.3 C.

1.02 System Description

- A** Access floor system shall consist of nominal 24" square, modular panels supported by and secured to appropriate understructure.
- B** All components of the access floor system are to be of steel construction except for panel-cementitious core, surfacing materials and sound deadening pads between panel and supports.
- C** Panels shall be easily removable by one person with standard tools and a lifting device and shall be interchangeable except where cut for special conditions.
- D** Stringers shall be easily removable without the use of special tools. Fasteners for stringer attachment shall be accessible from the top surface of the stringer.
- E** Complete floor system shall be sturdy, rigid and free of overall rocking, rattles, squeaks and noises. The finished floor shall be level within $\pm 0.100"$ and shall be level within $\pm 0.062"$ in any 10' direction.
- F** Quantities, finished floor height (FFH) and location of accessories shall be as specified on the contract drawings.

- G** System shall be electrically conductive for dissipation of static while having enough electrical resistance to provide protection against electrical shock.

1.03 Quality Assurance

- A** Manufacturer shall have a history of successful projects of similar size and complexity. All structural access floor components shall be supplied by one manufacturer to ensure compatibility.
- B** Contractor shall be approved by the manufacturer, use manufacturer-approved service personnel and shall have a history of five years of successful projects of similar size and complexity.
- C** Method for testing concentrated, ultimate and rolling loads of access floor panels shall be in accordance with the CISCA Standard Test Procedure and shall be performed by an independent testing laboratory regularly engaged in the testing of access floor systems and components.
- D** Method for testing resistance of the access floor system shall be in accordance with NFPA No. 99, Chapter 3, modified, when maintaining the room at 45% \pm 5% relative humidity.
- E** Panels without covering shall have a Class A flame spread rating when tested in accordance with ASTM E 84-81a.
- F** Access floor shall be capable of resisting the horizontal force (Fp) in accordance with the current Uniform Building Code standards for a(n) _____ (building type: office, computer room, hospital, school, etc.) in seismic zone _____. (Applies to seismic zones 2, 3 and 4 only. Consult your USG Interiors representative for recommended values.)

1.04 Sequencing/Scheduling

- A** A pre-job conference to establish schedule, review shop drawings and coordinate trades must be attended by the general contractor, the access floor contractor, the mechanical contractor, the electrical contractor, and all others whose work may be affected by the access floor system.
- B** Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- C** Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system.
- D** Traffic shall not be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.

1.05 Submittals

- A** Manufacturer qualifications.
- B** Contractor qualifications.
- C** Certification that material and installation are in accordance with the specification.
- D** Test reports by an independent testing laboratory certifying that component parts perform as specified.
- E** One each of the following are to be submitted for review as specified: floor panel, pedestal and service outlet.

- F** Shop drawings of panel layout shall include railings, steps and ramp locations with details of assembly components, anchoring methods, perimeter conditions, service boxes, cutouts, grounding methods and interfaces with other conditions.

1.06 Delivery and Placement

- A** Materials shall be delivered in original, unopened packages clearly labeled with the manufacturer's name and item description.
- B** Material packages shall be distributed around the areas where they will be used to avoid overstressing the subfloor and to facilitate installation.

1.07 Project Conditions

- A** General contractor shall provide secure storage and a clean subfloor which is free of dust, construction debris and other trades during the installation of access floor.
- B** Building shall be enclosed and the temperature shall be maintained between 40°F and 90°F.

Part 2—Products

2.1 Manufacturer

The access floor system shall consist of panels and compatible understructure designed and manufactured by USG Interiors, Inc., Access Floor Systems, Red Lion, PA.

Office Systems

2.02 Materials

- A** Floor panels:
 - (1) Panels shall be welded steel components with an enclosed bottom pan formed in a uniform pattern of square pockets. The unitized panels shall be internally filled with a lightweight cementitious material to improve sound characteristics and to provide performance values as specified.
 - (2) Chipboard or particleboard material is unacceptable.
 - (3) Panels shall be protected against corrosion internally with a phosphate coating and externally with a conductive epoxy coating applied in an immersion dip process.
 - (4) Panel assembly shall include four fasteners for attachment to the panel.
 - (5) Panels shall bear model number identification permanently stamped into the metal bottom surface of each panel.
- B** Floor covering: Panels shall be supplied bare with carpet tiles to be furnished and field installed by others.
Note: Contact your USG Interiors representative for recommendations of suitable carpet tile materials.
- C** Pedestals for Seismic Zones 0, 1, 2: For floor heights from 6" to 24":
 - (1) Pedestal assemblies shall be all-steel welded construction, corrosion resistant and capable of supporting a 5,000 lb. load without permanent deformation of any part.

- (2) Pedestal head shall be galvanized, die-cut steel welded to a $\frac{7}{8}$ -14 UNF threaded tube with a leveling nut and a gravity-activated metal locking collar. Pedestal head assembly shall provide vibration-proof leveling in increments of 0.012" and an overall height adjustment of 2".
- (3) Pedestal base shall consist of a galvanized steel tube with a minimum wall thickness of 0.060" welded to a 4"-square, $\frac{1}{8}$ "-thick galvanized steel base plate.
- (4) Pedestals shall be secured to subfloor with Bogart #282 or DAP 2000 adhesive or approved equal.
- (5) Pedestal assemblies adhered to unsealed concrete subfloor shall be capable, without panels in place, of resisting a 1,000 in.-lb. overturning moment without failure of adhesive or any part of the pedestal.

For floor heights under 6" or higher than 24", and Seismic Zones 3 and 4, contact your USG Interiors representative.

D Accessories:

- (1) Service outlets shall be provided at locations detailed on the contract drawings. Outlets shall be UL-listed access floor boxes capable of accommodating power, signal and communications cables. The service outlet shall be a drop-in design having a hinged LEXAN lid with cable hooks and capable of supporting a 1000-lb. concentrated load.
- (2) Provide manufacturer's standard steps, ramps, handrails, fascia plate, expansion joints, perimeter ledge support, cove base and/or access holes with grommets where indicated on the contract drawings.
- (3) Provide manufacturer's standard lifting device compatible with the panel.

E Maintenance materials: provide the following spare materials: _____panels, _____pedestals, _____service outlets, and _____panel lifting devices.

2.03 Office System

A Structural performance: The

Panel/CORNERLOC system shall perform as indicated below.

Panel System Type	Rated Rolling Load (Lbs.)	Rated Conc. Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)
SF-800	600	800	2300	100
SF-1000	800	1000	3000	125
SF-1250	1000	1250	3200	150
SF-1500	1200	1500	3500	175

Rated system loads shown are recommended by USG Interiors and tested in accordance with Cisca Testing Standards.

B Electrical resistance: Panel-to-understructure (metal-to-metal) connections shall provide less than 10 ohms resistance without grounding clips.

Computer Room Systems

2.02 Materials

A Floor panels:

- (1) Panels shall be 24"-square, all-steel, unitized, welded construction with a minimum of 140 welds and a uniform bottom pan pattern of formed modular pockets to resist deflection anywhere on the panel.
- (2) Chipboard or particleboard material is unacceptable.
- (3) Panels shall be protected against corrosion inside and out with a conductive epoxy coating applied in an immersion dip process.
- (4) Panel trim shall be integral to the high pressure laminate (HPL). Separate trim pieces are not acceptable.
- (5) Load rating shall be identified by stamping the panel type and concentrated load rating into the metal at the bottom surface of each panel.

B Floor covering: Panels shall be surfaced with HPL, high wear type, grade HW 62 (0.060"), conforming to NEMA LD3-1985 standards. Note: Contact your USG Interiors representative for availability of other surface coverings.

C Pedestals for Seismic Zones 0, 1, 2A: For floor heights from 6" to 24":

- (1) Pedestal assemblies shall be all-steel welded construction, corrosion resistant and capable of supporting a 5,000 lb. load without permanent deformation of any part.
- (2) Pedestal head shall be die-cut steel welded to a $\frac{7}{8}$ -14 UNF threaded tube with a leveling nut and a gravity-activated metal locking collar. Pedestal head assembly shall provide vibration-proof leveling in increments of 0.012" and an overall vertical height adjustment of 2".
- (3) Pedestal base shall be a galvanized steel tube with a minimum wall thickness of 0.060" welded to a 4"-square, $\frac{1}{8}$ "-thick galvanized steel base plate.
- (4) Pedestal assemblies adhered to subfloor, without panels or stringers in place, shall be capable of resisting a 1,000 in.-lb. overturning moment without failure of adhesive or any part of the pedestal.
- (5) Pedestals shall be secured to subfloor with Bogart #282 or DAP 2000 adhesive or approved equal.

For floor heights under 6" or higher than 24", and Seismic Zones 3 and 4, contact your USG Interiors representative.

D Stringers

- (1) Stringers shall support each edge of panel.
- (2) Stringers shall be galvanized steel and capable of supporting a 450-lb. load on 1 sq. in. at the center of a 21 $\frac{1}{8}$ " span with a permanent set not to exceed 0.010".
- (3) Stringers shall have conductive material for sound deadening and plenum seal.

- (4) Stringers shall be individually and rigidly fastened to the pedestal with one $\frac{1}{4}$ " bolt for each foot of stringer length. Bolts shall provide positive electrical contact between the stringers and pedestals. Connections depending on gravity or spring action are unacceptable.
- (5) Stringer grid shall be 4' stringers in a basketweave configuration ensuring maximum lateral stability in all directions. (Also available in 2' x 4' and 2' x 2' stringer systems.)

E Accessories:

- (1) Airflow panels (with or without dampers) shall be interchangeable with solid panels and shall be provided as specified on the contract drawings. Panels shall have approximately 25 % open area and deliver 585 CFM at 0.100" static pressure with damper full open (or 770 CFM at 0.100" static pressure without damper). Panels shall be capable of supporting a 1,000-lb. (or 1,250-lb.) concentrated load. Dampers, if provided, shall be adjustable from the top surface of each panel at a centrally located control.
 - (2) If required, LEXAN grilles with adjustable dampers shall be provided in the locations detailed on contract drawings. Grilles shall deliver 468 CFM at 0.100" static pressure and shall be able to support a 1,000-lb. concentrated load.
 - (3) Service outlets shall be provided at locations detailed on the contract drawings. Outlets shall be UL-listed access floor boxes capable of accommodating power, signal and communications cables. The service outlet shall be a drop-in design having a hinged LEXAN lid with cable hooks and capable of supporting a 1000-lb. concentrated load.
 - (4) Provide manufacturer's standard steps, ramps, handrails, fascia plate, expansion joints, perimeter ledge support, cove base and/or access holes with grommets where indicated on the contract drawings.
 - (5) Provide manufacturer's standard lifting device compatible with the panel.
- F Maintenance materials:** provide the following spare materials: _____panels, _____pedestals, _____service outlets, and _____panel lifting devices.

2.03 Computer Room System

A Structural performance: The Panel/Edge Support Rigid Grid system shall perform as indicated below.

Panel System Type	Rated Rolling Load (Lbs.)	Rated Conc. Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)
AS-1000	400	1000	4000	100
AS-1250	500	1250	4500	110
AS-1500	600	1500	4700	120

Rated system loads shown are recommended by USG Interiors and tested in accordance with Cisca Testing Standards.

- B** Electrical resistance:
- (1) The resistance of the access floor system shall be between 5.0×10^5 and 2.0×10^{10} ohms measured from the floor covering to the pedestal.
 - (2) Panel-to-understructure (metal-to-metal) contacts shall have not more than 10 ohms resistance. Continuity clips shall be installed as required.

Part 3—Execution

3.01 Inspection

- A** Examine structural subfloor for unevenness, irregularities and dampness that would affect the quality and execution of the work. Do not proceed with installation until structural floor surfaces are level, clean and dry.
- B** Concrete sealers, if used, shall be identified and proven to be compatible with pedestal adhesive. If other than USG Interiors recommended adhesives or sealers are used, verify that adhesive achieves bond to slab before commencing work.
- C** Verify dimensions on contract drawings, including level of interfaces such as abutting floor, ledges and door sills.

3.02 Installation

- A** Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- B** Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. Traffic shall not be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.
- C** Floor system and accessories shall be installed under the supervision of the manufacturer's authorized representative and according to manufacturer's recommendations.
- D** No dust- or debris-producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.
- E** Subfloor shall be kept broom clean as installation progresses.
- F** Partially complete floors shall be braced against shifting to maintain integrity of the installed system.
- G** Additional pedestals as needed shall support panels where floor is disrupted by columns, walls and cutouts.
- H** Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.
- I** Finished floor shall be level, not varying more than 0.062" in 10' or 0.100" overall.
- J** Installed system shall be free of vibration, rocking, rattles, squeaks and other unacceptable performance.
- K** Plenum dividers shall be accurately scribed and fit to the subfloor and sealed with mastic to ensure maintenance of plenum effect.

- L** Facia:
- (1) Shall be accurately scribed and fit to subfloor and adjacent finished floor.
 - (2) Set in mastic and seal if required for plenum effect.
- M** Cutouts:
- (1) Make cutouts required for services penetrating panels.
 - (2) Seal edges with grommets, plastic trim, molding and/or gaskets.
- N** Acceptance: General contractor shall accept floor in whole or part prior to allowing use by other trades.

3.03 Cleaning, Protection and Grounding After Completion of Installation—By Others

- A** Vacuum clean the entire system.
- B** Before any equipment is moved across the access floor, it shall be protected by 1/2" plywood.
- C** Electrical contractor shall connect the access floor to building ground as follows: Three 12 AWG bare grounding wires, one on each quarter line of the installation, shall run the width of the building and be attached to every fourth pedestal. Another wire shall connect these wires to each other and to the building ground.

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1991 Architectural Reference Library



This new series of technical folders replaces the 1990 editions with *four exceptions*:

- SA-921 USG Resilient Drywall/Steel-Framed Systems
- SA-922 USG High-Attenuation Wall Systems
- SA-925 USG Area Separation Wall Systems
- SA-933 Texture and Finish Products

These folders should all be retained in their 1990 editions.

Three folders have been added to the Architectural Reference Library: *UN-30 Unimast Steel Framing Systems: Technical Information*, *SA-906 Integrated Ceilings Specialty Products* and *SA-1119 STRUCTOCORE Security Wall Systems*.

New features in the 1991 Library are:

Div. 1 Selector

Revised data on THERMAFIBER Curtain Wall Systems. (SA-100)

Div. 5 Steel Framing Systems

Unimast Incorporated catalog includes product descriptions, section properties, span and load data, limiting heights and other technical information on steel framing systems. (UN-30)

Div. 7 Exterior Cement Board Systems

Revised specification includes 2-day installation of DUROCK Exterior Finish system, application of DUROCK Exterior Finish to concrete or masonry, and revised control joint spacing. Architectural details expanded. (SA-700)

Div. 7 Insulation Systems

Expanded data and test descriptions for Fire/Smoke-Stop System, Curtain Wall Insulation and Sound Attenuation Fire Blankets. (SA-707)

Div. 9 Ceiling Suspension Systems

Added new DXW Grid with 1½" face. Added new island trims for DX, CENTRICITEE, FINELINE and Geometrix Grids. Selection chart revised to include new panel edge details. (SA-904)

Div. 9 Acoustical Treatments

Added new ORION Ceiling Panels and new AURATONE Allegro, Calypso and Profile Panels. Revised all product data to reflect new panel edges. Selection chart revised to include new panel edge details. (SA-905)

Integrated Ceilings Specialty Products include luminous skylights, reflective ceilings, fabric-wrapped ceilings and walls, open plenum treatments and acoustical linear metal. Specialty materials include acrylic "glass block" panels and pressed metal panels. (SA-906)

Div. 9 Lath & Plaster

New coverage charts for basecoat and finish plasters. Fire tests for concrete block veneer plaster partitions added. (SA-920)

Div. 9 Gypsum Board

Revised limiting heights, physical and structural properties for steel-framed drywall systems. (SA-923)

New USG High Performance Floor/Ceiling Systems achieve 2-hour fire resistance rating (UL Design L541) and deliver STC/MTC ratings as high as 60/54, IIC ratings as high as 62. (SA-924)

New ½" SHEETROCK brand Interior Gypsum Board supports water-based spray texture paints and insulation like ⅝" thick board but with in-place construction costs reduced. (SA-927)

Div. 9 Prefinished Panels

TEXTONE Vinyl-Faced Gypsum Panel colors and patterns shown in larger sizes for easier selection. (SA-928)

Div. 9 Interior Cement Board Systems

New DUROCK Underlayment for floors and counter tops. The 4'x4' size is easy to handle, helps cut down on waste. The nominal ⅝" thickness helps minimize level variations with other finish materials. (SA-932)

Div. 10 Specialty Partitions

Added variable module applications using DONN High Performance Wall. (SA-1020)

Div. 10 Access Floors

Added new aluminum Rigid Grid understructure and AMP pop-up electrical box. (SA-1027)

Div. 11 Security Walls

STRUCTOCORE Security Wall Systems provide continuous steel reinforcement for high-strength plaster base and finish; used for jail cell partitions, security vaults and other walls requiring high abuse-resistance. (SA-1119)

USG



United States Gypsum

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The construction industry's most trusted steel products from a responsive new company.

Unimast Incorporated is a company devoted to the construction steel business. Formed in 1989 with the purchase of United States Gypsum Company's construction steel operations, Unimast is one of the nation's largest suppliers of construction steel.

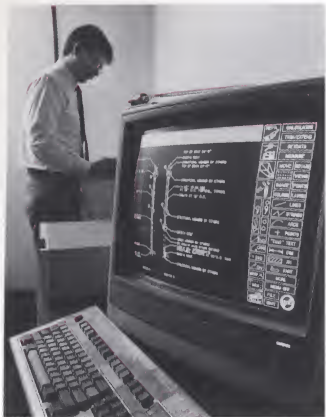
Unimast produces light steel framing, studs and runners, beads and trims, metal lath for plastering and many other construction steel products. Unimast markets most of these products under its own name, and is also the exclusive supplier of United States Gypsum Company construction steel products. Those products include special studs and components for shaft wall and area separation wall systems as well as control joints and other metal products made to United States Gypsum Company Specifications.

Unimast recognizes that uncompromised quality is essential to support the performance requirements of its customers. As a measure of this high quality, products are designed to meet or exceed industry standards established by the American Society for Testing and Materials (ASTM), the American Iron and Steel Institute (AISI) and all major code bodies.

Unimast's commitment to service sets it apart from its competitors. While other manufacturers can produce construction materials, none can consistently offer the reliable sales support, in-depth technical assistance and on-time delivery. Unimast's commitment to service extends to all areas of operation, including packaging for safety, color coding and labeling for inventory, special-count bundling and job-ready loading.

It's what you get from Unimast.
It's what you expect from a leader.

TECHNICAL SUPPORT



Unimast is committed to providing technical support to its customers. Its technical support engineers are experts in structural design and light steel framing engineering. They assist architects, engineers, contractors and dealers in specifying those assemblies and components that will safely and economically meet design objectives. Engineering services include answers to technical questions, development of details and framing drawings, and value engineering to ensure cost effective construction.

This manual, "Steel Framing Systems: Technical Information" contains information on the framing of load bearing systems, curtain wall systems and interior non-load bearing partitions. Load tables and

limiting height tables are for single and, in some cases, double-span conditions.

Many framing systems used in construction projects are more complex, involving cantilevers, spandrels, parapets and unique details. These systems require additional analysis not provided within the tables but available from Unimast's Technical Departments.

Section properties and steel properties vary among manufacturers. The information provided by the Unimast Technical Departments and within Unimast's literature applies only to Unimast's steel framing. For assistance in sizing Unimast's steel framing, call Unimast's Technical Departments.

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This publication contains the latest technical information available at the time of printing on Unimast Steel Framing. Unimast reserves the right to make improvements in, or change materials and/or configurations of, any products in this literature, without prior notice or obligation. For the latest information or technical assistance, contact your local Unimast Technical Departments or Marketing Departments.

The products described in this literature include Unimast's light steel framing, drywall steel and accessories.

- Unimast's light steel framing can be used in load bearing and curtain wall applications.
- Unimast's drywall steel can be used in interior non-load bearing applications.
- Unimast's 20 gauge drywall steel can be used in curtain wall applications.

Use of Unimast's products for particular applications is dependent upon gauge, coating, yield strengths, section

properties, testing, specifications and standards, such as those established by the American Society for Testing and Materials (ASTM) and the American Iron and Steel Institute (AISI). Information is provided in this literature to assist in the selection of the correct product for your application.

All member sizes, gauges and products may not be available from all manufacturing plants. Contact your local sales representative or the Unimast Customer Service Centers for information on availability.

Unimast's steel framing carries a three part code that identifies the size, style and gauge:

358 ST 25 — Gauge: 25, 22, 20
 Style: ST- stud
 CR-runner track
 Size: 158 - 1 5/8"
 212 - 2 1/2"
 358 - 3 5/8"
 400 - 4"
 600 - 6"

362 SJ 20 — Gauge: 20, 18, 16, 14
 Style: SJ - stud/joist
 CR-runner track
 Size: 362 - 3 5/8"
 40 - 4"
 60 - 6"
 725 - 7 1/4"
 80 - 8"
 925 - 9 1/4"
 115 - 11 1/2"
 135 - 13 1/2"

Table 1

Steel Thickness

Style	Gauge	Design		Minimum		End Color Code
		in	mm	in	mm	
ST,CR25	25	.0188	.48	.0179	.45	none
ST,CR22	22	.0284	.72	.0270	.69	blue
ST,CR20	20	.0329	.84	.0312	.79	white
SJ,20	20	.0359	.91	.0341	.87	white
SJ,CR18	18	.0478	1.21	.0454	1.15	yellow
SJ,CR16	16	.0598	1.52	.0568	1.44	green
SJ,CR14	14	.0747	1.90	.0710	1.80	orange

Uncoated thickness.

ST stud

SJ (3 5/8", 4")

SJ (6" to 13 1/2")

CR runner



Unimast's light steel framing is manufactured from steel (20, 18, 16 and 14 gauge) having a yield strength of 40 ksi for studs and 33 ksi for runners. Members made from 33 ksi and 50 ksi yield strength steel in various thicknesses are available. Contact the Unimast Technical Service Departments for allowable load information and for section and physical properties.

Coatings on light steel framing are galvanized per ASTM A525 or ASTM A591 (A525 equivalent) or aluminum-zinc per ASTM A792. Coating thickness is G-60 or equivalent.

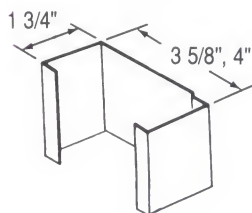
The **SJ** and **CR** members are available in depths of 3 5/8", 4", 6", 7 1/4", 8", 9 1/4", 11 1/2" and 13 1/2". Other select sizes are available on request. The **SJ** member is a unique channel-type section which permits nesting. With nesting, two members can be used to increase the structural

capacity without an increase in dimension of a single member. Slotted holes, or punch outs, 1 1/2" x 4", are located in the web for installation of cold-rolled channel lateral bracing. The holes also facilitate the installation of plumbing and electrical systems.

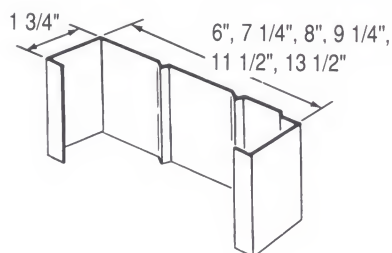
CR members (CR runners) are channel-shaped sections used as the top and bottom tracks of stud walls and as end support closures for joists at exterior walls or foundation walls. CR runners are available in all stud/joist sizes and gauges. Standard leg lengths on CR runners are 1-1/4".

SJ members are available in custom lengths up to 40' and **CR** members are available in standard lengths of 10'. Special requests for longer lengths depend on construction and manufacturing limitations. Call for availability.

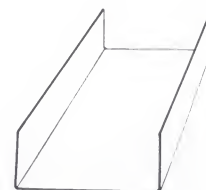
SJ studs



Nested joists

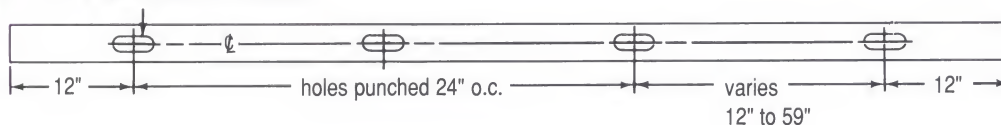


CR runner



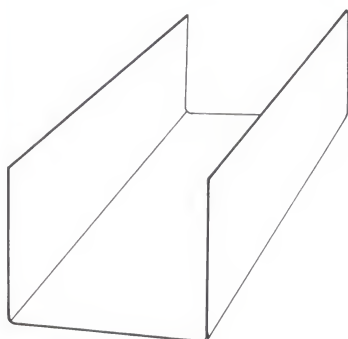
Standard hole placement (unpunched studs available on request)

1 1/2" x 4" web cutout on centerline

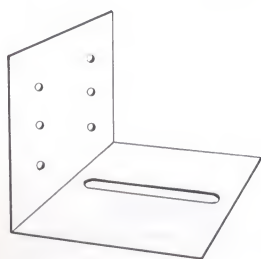


Note: See National Evaluation Service Report No. NER-211 for allowable values and/or conditions of use concerning material presented in this document. National Evaluation Reports are issued by the National Evaluation Service Committee of the Council of American Building Officials (ICBO, SBCC, BOCA) and are subject to re-examination, revisions, and possible closing.

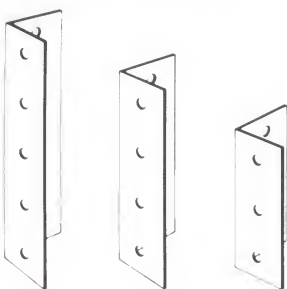
Deep leg track



Foundation clip



End clips



Deep Leg Track - CR runners with longer leg lengths, used for slip tracks in non-load bearing construction, are available in 20, 18, 16 and 14 gauge in 10' lengths. Inside web dimension, leg length and gauge must be specified when ordering.

Foundation Clips - Clips 5 1/2" x 5" x 16 gauge and 5" in length are used to anchor header joists and CR runners to the foundation. The clip accommodates 1/2" foundation anchor bolts through a 1/2" x 3" slotted hole which allows for inaccuracies in bolt placement. Pre-punched holes provide guides for attachment to joists or CR runners.

End Clips - 2" x 2" angles made from 14 gauge steel with pre-punched holes for screw attachment are available in 6", 8" and 10" lengths.

Channel Clips - Standard clips used for the attachment of 1 1/2" cold-rolled channel to studs are available in two sizes: 1 1/2" x 2" x 16 gauge, 3 3/8" length and 1 1/2" x 2" x 16 gauge, 5 3/4" length. Other clips are available by special order.

Framing Clips - 3" x 3" x 18 gauge clips x 3" length are available as standard clips for various framing details.

1 1/2" Cold-Rolled Channel - This channel is rolled formed from 16 gauge steel. Two coatings are available: galvanized or painted. Used for lateral bracing, the channel is inserted through stud punchouts and attached with welds or clip angles to the studs. It is available in 10', 16' and 20' lengths.

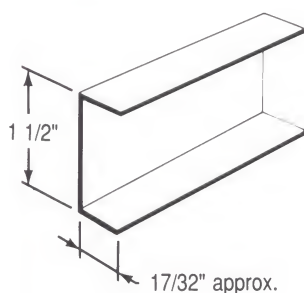
Web Stiffeners - Two piece web stiffeners are used for joists and studs at points of reaction and concentrated loads to prevent web crippling. They are formed of 14 gauge steel with predrilled holes for screw attachment to webs. Web stiffeners are available in 6", 7 1/4", 8", 9 1/4", 11 1/2" and 13 1/2" sizes.

Flat Strapping - Flat steel straps are available in 1 1/2" x 20 gauge x 10' lengths for lateral bracing of studs and 18 gauge for floor bridging. Strapping is also available in 18, 16 and 14 gauge, in 10' lengths and in varying widths, for diagonal bracing to resist racking. Longer lengths may be special ordered.

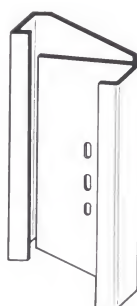
Screws - Unimast offers two brands of screws. Unimast's SUPER-TITE Screws are imported and are for use with 25, 22, and 20 gauge drywall steel (SUPER-TITE Drywall Screws); for use with 20 to 14 gauge steel framing (SUPER-TITE Drillers); and for use with wood (SUPER-TITE Type W - coarse thread). Unimast also offers domestically made Buildex Brand Screws which are available for use with drywall steel, light steel framing and wood.

Specials - Custom made angles, straps, runners and clips are also available from Unimast. Contact your Unimast Customer Service Center for availability.

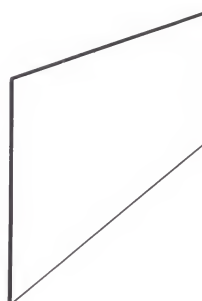
1 1/2" cold-rolled channel



Web stiffener (2 pieces)



Flat strap bracing



Screws

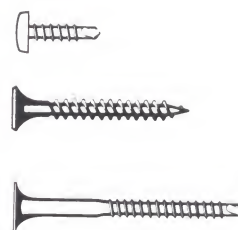


Table 2

SJ: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties					Torsional Properties				
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AET ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y ⁽⁴⁾ (in ³)	J (in ⁴)	C _w (in ⁶)	X ₀ (in)	j (in)	M _a (k-in)
362SJ20	0.0359	0.2697	0.551	0.273	0.104	0.088	1.429	0.621	0.2136	0.541	0.273	0.085	0.082 ^c	0.0001	0.3007	1.357	2.151	6.557
362SJ18	0.0478	0.3563	0.722	0.395	0.135	0.115	1.423	0.616	0.2713	0.708	0.385	0.111	0.106 ^c	0.0003	0.3870	1.345	2.146	9.247
362SJ16	0.0598	0.4573	0.911	0.499	0.181	0.158	1.411	0.629	0.3341	0.893	0.486	0.147	0.146 ^c	0.0005	0.5703	1.420	2.125	11.678
362SJ14	0.0747	0.5658	1.116	0.611	0.219	0.192	1.404	0.622	0.3917	1.093	0.596	0.178	0.176 ^c	0.0011	0.6833	1.406	2.118	14.293
40SJ20	0.0359	0.2822	0.683	0.341	0.107	0.089	1.556	0.617	0.1792	0.673	0.311	0.091	0.084 ^c	0.0001	0.3631	1.313	2.274	7.464
40SJ18	0.0478	0.3730	0.896	0.447	0.139	0.116	1.550	0.611	0.2576	0.882	0.437	0.117	0.108 ^c	0.0003	0.4679	1.301	2.271	10.500
40SJ16	0.0598	0.4781	1.133	0.566	0.187	0.160	1.539	0.626	0.3571	1.115	0.554	0.157	0.150 ^c	0.0006	0.6816	1.374	2.240	13.302
40SJ14	0.0747	0.5918	1.389	0.694	0.227	0.194	1.532	0.619	0.4833	1.366	0.679	0.189	0.181 ^c	0.0011	0.8176	1.359	2.234	16.300
60SJ20	0.0359	0.3540	1.798	0.597	0.122	0.094	2.253	0.587	0.2148	1.787	0.539	0.112	0.008 ^c	0.0002	0.8744	1.111	3.337	12.930
60SJ18	0.0478	0.4686	2.365	0.785	0.158	0.122	2.246	0.581	0.3107	2.350	0.773	0.145	0.118 ^c	0.0004	1.1309	1.099	3.348	18.561
60SJ16	0.0598	0.5977	3.008	0.999	0.214	0.168	2.243	0.598	0.4303	2.990	0.990	0.195	0.163 ^c	0.0007	1.5888	1.163	3.250	23.759
60SJ14	0.0747	0.7412	3.701	1.229	0.259	0.203	2.234	0.591	0.5858	3.679	1.218	0.236	0.197 ^c	0.0014	1.9148	1.148	3.261	29.231
725SJ18	0.0478	0.5284	3.746	1.029	0.167	0.124	2.663	0.562	0.2969	3.732	1.015	0.157	0.118 ^c	0.0004	1.7311	1.005	4.324	24.361
725SJ16	0.0598	0.6725	4.771	1.311	0.225	0.171	2.664	0.579	0.4304	4.753	1.303	0.211	0.166 ^c	0.0008	2.4067	1.064	4.180	31.268
725SJ14	0.0747	0.8346	5.880	1.615	0.273	0.207	2.654	0.572	0.6152	5.857	1.605	0.256	0.203 ^c	0.0015	2.9054	1.050	4.206	35.529
80SJ18	0.0478	0.5642	4.770	1.187	0.171	0.125	2.908	0.550	0.2937	4.756	1.161	0.159	0.118 ^c	0.0004	2.1644	0.956	5.020	27.874
80SJ16	0.0598	0.7173	6.078	1.513	0.231	0.172	2.911	0.568	0.4560	6.059	1.505	0.219	0.166 ^c	0.0009	2.9966	1.013	4.847	36.132
80SJ14	0.0747	0.8906	7.496	1.866	0.280	0.209	2.901	0.561	0.6936	7.473	1.856	0.265	0.205 ^c	0.0017	3.6201	0.999	4.883	44.557
925SJ16	0.0598	0.7921	8.710	1.875	0.240	0.174	3.316	0.550	0.4146	8.691	1.868	0.227	0.166 ^c	0.0009	4.1513	0.938	6.138	44.838
925SJ14	0.0747	0.9840	10.753	2.315	0.290	0.211	3.306	0.543	0.6028	10.730	2.306	0.278	0.206 ^c	0.0018	5.0200	0.925	6.193	55.351
115SJ16	0.0598	0.9266	15.046	2.606	0.251	0.177	4.030	0.521	0.4355	15.030	2.293	0.229	0.166 ^c	0.0011	6.7915	0.830	9.022	55.030
115SJ14	0.0747	1.1521	18.602	3.222	0.304	0.214	4.018	0.514	0.5366	18.580	3.214	0.292	0.207 ^c	0.0021	8.2221	0.818	9.121	77.138
135SJ14	0.0747	1.3015	28.014	4.134	0.313	0.216	4.639	0.491	0.8562	27.990	3.752	0.295	0.207 ^c	0.0024	11.8321	0.743	12.334	90.046

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (40ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination. (4) Based on web in tension (t) or compression (c).

Table 3

CR: Structural Properties⁽¹⁾

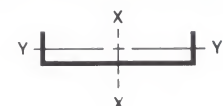
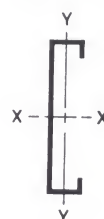
Member	A ⁽²⁾ (in ²)	t ⁽²⁾ (in)	Gross Properties						Effective Properties					Torsional Properties				
			I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AE ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y ⁽⁴⁾ (in ³)	J (in ⁴)	C _w (in ⁶)	X ₀ (in)	j (in)	Ma (k-in)
362CR20	0.199	0.0329	0.399	0.215	0.029	0.029	1.416	0.379	0.106	0.328	0.160	0.019	0.004 ⁱ	0.00007	0.0670	0.674	2.106	3.170
362CR18	0.290	0.0478	0.579	0.311	0.041	0.042	1.417	0.376	0.231	0.548	0.259	0.027	0.014 ⁱ	0.00022	0.0995	0.670	2.063	5.127
362CR16	0.362	0.0598	0.730	0.388	0.050	0.052	1.422	0.374	0.314	0.721	0.348	0.050	0.027 ⁱ	0.00043	0.1244	0.665	2.075	6.897
362CR14	0.452	0.0747	0.914	0.483	0.062	0.064	1.425	0.371	0.424	0.914	0.464	0.062	0.051 ⁱ	0.00084	0.1542	0.659	2.084	9.199
40CR20	0.211	0.0329	0.501	0.246	0.029	0.029	1.541	0.372	0.107	0.415	0.185	0.020	0.004 ⁱ	0.00008	0.0840	0.645	2.365	3.670
40CR18	0.308	0.0478	0.728	0.355	0.042	0.042	1.542	0.369	0.233	0.690	0.298	0.028	0.014 ⁱ	0.00023	0.1249	0.641	2.317	5.906
40CR16	0.385	0.0598	0.916	0.443	0.052	0.052	1.546	0.367	0.318	0.905	0.400	0.052	0.027 ⁱ	0.00046	0.1558	0.636	2.332	7.913
40CR14	0.480	0.0747	1.147	0.551	0.064	0.065	1.549	0.365	0.432	1.147	0.531	0.064	0.052 ⁱ	0.00089	0.1930	0.630	2.344	10.522
60CR20	0.277	0.0329	1.320	0.434	0.032	0.031	2.183	0.341	0.111	1.046	0.304	0.022	0.004 ⁱ	0.00010	0.2170	0.527	4.239	6.020
60CR18	0.403	0.0478	1.915	0.628	0.046	0.044	2.183	0.338	0.241	1.828	0.546	0.031	0.015 ⁱ	0.00031	0.3172	0.523	4.174	10.808
60CR16	0.504	0.0598	2.404	0.784	0.057	0.054	2.186	0.336	0.332	2.377	0.721	0.057	0.029 ⁱ	0.00060	0.3943	0.519	4.204	14.274
60CR14	0.630	0.0747	3.006	0.975	0.070	0.067	2.188	0.333	0.459	3.006	0.947	0.070	0.054 ⁱ	0.00117	0.4871	0.514	4.231	18.749
725CR18	0.463	0.0478	3.054	0.830	0.048	0.044	2.572	0.321	0.242	2.924	0.733	0.032	0.015 ⁱ	0.00035	0.4891	0.470	5.757	14.518
725CR16	0.579	0.0598	3.830	1.037	0.059	0.055	2.575	0.319	0.336	3.788	0.962	0.059	0.029 ⁱ	0.00069	0.6072	0.466	5.798	19.056
725CR14	0.723	0.0747	4.786	1.291	0.072	0.068	2.576	0.317	0.468	4.786	1.257	0.072	0.055 ⁱ	0.00134	0.7494	0.462	5.836	24.895
80CR18	0.499	0.0478	3.907	0.964	0.048	0.045	2.802	0.312	0.243	3.749	0.858	0.032	0.015 ⁱ	0.00038	0.6121	0.443	6.862	16.982
80CR16	0.624	0.0598	4.898	1.204	0.060	0.056	2.805	0.310	0.338	4.843	1.122	0.060	0.029 ⁱ	0.00074	0.7595	0.440	6.909	22.222
80CR14	0.779	0.0747	6.120	1.500	0.074	0.069	2.806	0.308	0.471	6.119	1.462	0.074	0.055 ⁱ	0.00145	0.9368	0.435	6.954	28.953
925CR18	0.559	0.0478	5.644	1.207	0.050	0.045	3.182	0.298	0.245	5.743	0.955	0.033	0.015 ⁱ	0.00042	0.8508	0.405	8.960	18.907
925CR16	0.699	0.0598	7.074	1.507	0.061	0.056	3.185	0.296	0.341	6.998	1.414	0.060	0.030 ⁱ	0.00083	1.0550	0.401	9.020	27.994
925CR14	0.872	0.0747	8.836	1.877	0.075	0.069	3.186	0.294	0.477	8.836	1.835	0.075	0.056 ⁱ	0.00161	1.3004	0.069	9.077	36.333
115CR16	0.833	0.0598	12.402	2.132	0.063	0.057	3.861	0.275	0.344	12.349	1.816	0.061	0.030 ⁱ	0.00010	1.7207	0.348	13.629	35.953
115CR14	1.040	0.0747	15.488	2.656	0.078	0.070	3.862	0.273	0.483	15.488	2.604	0.077	0.056 ⁱ	0.00193	2.1193	0.344	13.705	51.559
135CR14	1.190	0.0747	23.595	3.454	0.079	0.071	4.456	0.258	0.487	23.594	3.323	0.077	0.057 ⁱ	0.00221	3.0276	0.071	18.694	65.803

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination. (4) Based on web in tension (t) or compression (c).

A full unreduced gross cross sectional area away from the hole
 ANET full cross sectional area at hole
 AET effective cross sectional area based on stub column test
 AE effective cross sectional area based on 1986 AISI
 t design thickness (uncoated)
 I_x, I_y moment of inertia of the gross section; and the effective section about the principal axis
 S_x, S_y section modulus of the gross section; and the effective section at yield about the principal axis
 r_x, r_y radius of gyration of the gross cross section away from the hole
 J St. Venant torsion constant
 C_w torsional-warping constant of the cross section
 X₀ distance between center of gravity of gross cross section and shear center along the x-x axis
 j section property for torsional-flexural buckling
 M_a allowable bending moment about the x-x axis

SJ

CR



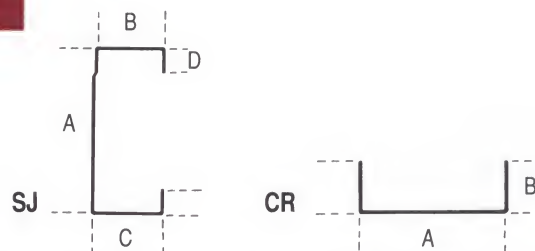


Table 4

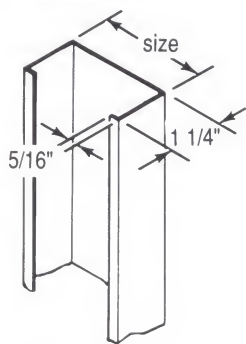
SJ and CR: Physical Properties

SJ									CR						
Member	Dimension (in)				t ⁽¹⁾	ANET ⁽¹⁾ (in ²)	Weight ⁽²⁾		Member	Dimension (in)			A ⁽¹⁾ (in ²)	Weight ⁽²⁾	
	A	B	C	D			(lb/ft)	(kg/m)		A	B	t ⁽¹⁾		(lb/ft)	(kg/m)
362SJ20	3.573	1.552	1.724	0.500	0.0359	0.216	0.97	1.44	362CR20	3.706	1.25	0.0329	0.199	0.696	1.04
362SJ18	3.573	1.552	1.724	0.500	0.0478	0.285	1.24	1.85	362CR18	3.729	1.25	0.0478	0.290	1.01	1.50
362SJ16	3.573	1.552	1.724	0.625	0.0598	0.368	1.59	2.37	362CR16	3.760	1.25	0.0596	0.362	1.26	1.88
362SJ14	3.573	1.552	1.724	0.625	0.0747	0.454	2.00	2.98	362CR14	3.789	1.25	0.0747	0.452	1.58	2.34
40SJ20	3.921	1.552	1.724	0.500	0.0359	0.228	1.02	1.52	40CR20	4.084	1.25	0.0329	0.211	0.734	1.10
40SJ18	3.921	1.552	1.724	0.500	0.0478	0.301	1.30	1.93	40CR18	4.105	1.25	0.0478	0.308	1.07	1.59
40SJ16	3.921	1.552	1.724	0.625	0.0598	0.388	1.67	2.48	40CR16	4.135	1.25	0.0598	0.385	1.34	1.99
40SJ14	3.921	1.552	1.724	0.625	0.0747	0.480	2.09	3.11	40CR14	4.164	1.25	0.0747	0.480	1.67	2.49
60SJ20	5.921	1.552	1.724	0.500	0.0359	0.300	1.27	1.89	60CR20	6.084	1.25	0.0329	0.277	0.969	1.44
60SJ18	5.921	1.552	1.724	0.500	0.0478	0.397	1.63	2.43	60CR18	6.105	1.25	0.0478	0.403	1.40	2.09
60SJ16	5.921	1.552	1.724	0.625	0.0598	0.508	2.08	3.10	60CR16	6.135	1.25	0.0596	0.504	1.76	2.61
60SJ14	5.921	1.552	1.724	0.625	0.0747	0.629	2.62	3.90	60CR14	6.164	1.25	0.0747	0.630	2.19	3.26
725SJ18	7.171	1.552	1.724	0.500	0.0478	0.457	1.84	2.74	725CR18	7.355	1.25	0.0478	0.463	1.61	2.39
725SJ16	7.171	1.552	1.724	0.625	0.0598	0.583	2.34	3.48	725CR16	7.385	1.25	0.0598	0.579	2.02	3.00
725SJ14	7.171	1.552	1.724	0.625	0.0747	0.720	2.95	4.39	725CR14	7.414	1.25	0.0747	0.723	2.56	3.81
80SJ18	7.921	1.552	1.724	0.500	0.0478	0.493	1.97	2.93	80CR18	8.105	1.25	0.0478	0.499	1.74	2.59
80SJ16	7.921	1.552	1.724	0.625	0.0598	0.628	2.50	3.72	80CR16	8.135	1.25	0.0598	0.624	2.17	3.23
80SJ14	7.921	1.552	1.724	0.625	0.0747	0.779	3.15	4.69	80CR14	8.164	1.25	0.0747	0.779	2.75	4.09
925SJ16	9.171	1.552	1.724	0.625	0.0598	0.702	2.76	4.11	925CR18	9.355	1.25	0.0478	0.559	1.94	2.89
925SJ14	9.171	1.552	1.724	0.625	0.0747	0.872	3.48	5.18	925CR16	9.385	1.25	0.0598	0.699	2.43	3.62
									925CR14	9.414	1.25	0.0747	0.872	3.08	4.58
115SJ16	11.421	1.552	1.724	0.625	0.0598	0.837	3.23	4.81	115CR16	11.635	1.25	0.0598	0.833	2.90	4.32
115SJ14	11.421	1.552	1.724	0.625	0.0747	1.040	4.07	6.06	115CR14	11.664	1.25	0.0747	1.040	3.86	5.48
135SJ14	13.421	1.552	1.724	0.625	0.0747	1.189	4.60	6.84	135CR14	13.664	1.25	0.0747	1.190	4.21	6.26

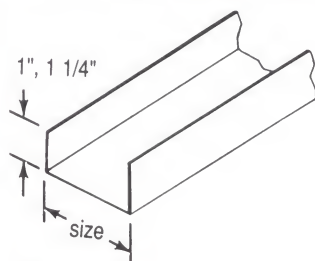
(1) Design thickness without coating. (2) Average shipping weight including coating.

DRYWALL STEEL: Product Description

ST stud



CR runner



Unimast's drywall steel includes the studs and runners manufactured from 25, 22 and 20 gauge steel. These studs and runners are used for interior non-load bearing applications. 20 gauge drywall studs and runners may also be used for curtain wall applications.

The studs are designated by **ST** and the runners by **CR**. The **ST** and **CR** are available in 1 5/8", 2 1/2", 3 5/8", 4" and 6" depths. The **ST** member is nestable because of the slight difference in flange lengths. When nested, two members fit together in the space of one. The **ST** studs have key hole shaped punch outs 24" o.c., except for the spacing of the top two holes which may vary. These key holes are used for convenience in installing electrical and plumbing systems and are for cold-rolled channel, when required.

The **ST** members are available in

stock lengths of 8', 9', 10', 12' and 16', depending on size and gauge. Custom length studs are also available. **CR** runners are available in standard 10' lengths. Special requests for non-standard lengths may be met. Contact the Unimast Customer Service Centers for availability.

Unimast's 25, 22 and 20 gauge meet ASTM C 645, "Standard Specification for Non-load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board". The 25 gauge steel has a minimum thickness of 0.0179" before application of coating and the **ST** flanges are 1 1/4" wide. These are two very specific requirements of ASTM C 645. The steel thicknesses, both design and minimum thickness, for all gauges of the drywall studs are shown in Table 1. Structural and Physical Properties are in Tables 5, 6, and 7.

Table 5

ST: Structural Properties⁽¹⁾

Member	$I_x^{(2)}$ (in ⁴)	$S_x^{(2)}$ (in ³)	r_x (in)	$I_y^{(2)}$ (in ⁴)	$S_y^{(2)}$ (in ³)	r_y (in)	Allowable moment (k-in)
158ST25	0.038	0.040	0.678	0.018	0.024	0.484	0.795
212ST25	0.101	0.071	1.012	0.019	0.024	0.480	1.398
358ST25	0.239	0.113	1.415	0.019	0.024	0.464	2.234
400ST25	0.302	0.123	1.545	0.019	0.024	0.459	2.441
600ST25	0.773	0.184	2.209	0.019	0.024	0.427	3.633
212ST22	0.155	0.110	1.008	0.032	0.037	0.475	2.187
358ST22	0.367	0.182	1.410	0.033	0.037	0.460	3.606
400ST22	0.463	0.209	1.539	0.033	0.038	0.454	4.133
600ST22	1.224	0.342	2.202	0.034	0.038	0.422	6.762
212ST20	0.175	0.123	1.006	0.039	0.044	0.473	2.706
358ST20	0.414	0.213	1.407	0.045	0.046	0.458	4.698
400ST20	0.523	0.246	1.536	0.046	0.047	0.452	5.423
600ST20	1.385	0.437	2.199	0.051	0.048	0.420	9.642

(1) Yield strength (F_y) is 33 ksi. Assumes full lateral support. For laterally unbraced structural member, see Section C3.1.2 of the 1986 AISI Design Specifications. (2) Effective properties based on 1986 AISI Design Specifications.

ST

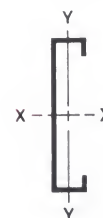


Table 6

ST: Physical Properties

Member	Dimension (in)				$t^{(1)}$ (in)	$ANET^{(2)}$ (in ²)	Weight ⁽³⁾	
	A	B	C	D			lb/ft	kg/m
158ST25	1.625	1.250	1.328	0.328	0.0188	0.085	0.33	0.49
212ST25	2.500	1.250	1.328	0.328	0.0188	0.102	0.38	0.57
358ST25	3.625	1.250	1.328	0.328	0.0188	0.123	0.45	0.67
400ST25	4.000	1.250	1.328	0.328	0.0188	0.130	0.48	0.71
600ST25	6.000	1.250	1.328	0.328	0.0188	0.167	0.61	0.91
158ST22	1.625	1.250	1.328	0.328	0.0284	0.100	0.45	0.67
212ST22	2.500	1.250	1.328	0.328	0.0284	0.103	0.53	0.79
358ST22	3.625	1.250	1.328	0.328	0.0284	0.135	0.64	0.95
400ST22	4.000	1.250	1.328	0.328	0.0284	0.146	0.68	1.01
600ST22	6.000	1.250	1.328	0.328	0.0284	0.203	0.88	1.31
158ST20	1.625	1.250	1.328	0.328	0.0329	0.144	0.56	0.83
212ST20	2.500	1.250	1.328	0.328	0.0329	0.173	0.73	1.09
358ST20	3.625	1.250	1.328	0.328	0.0329	0.210	0.85	1.27
400ST20	4.000	1.250	1.328	0.328	0.0329	0.223	0.90	1.34
600ST20	6.000	1.250	1.328	0.328	0.0329	0.288	1.17	1.74

(1) Design thickness without coating. (2) Excluding coating through section at hole. (3) Average shipping weight including coating.

ST

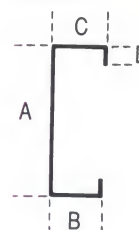


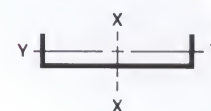
Table 7

CR: Structural Properties⁽¹⁾

Member	$I_x^{(2)}$ (in ⁴)	$S_x^{(2)}$ (in ³)	r_x (in)	Allowable moment (k-in)
158CR25	0.025	0.022	0.663	0.443
212CR25	0.070	0.043	0.992	0.848
358CR25	0.172	0.061	1.366	1.209
400CR25	0.222	0.068	1.488	1.340
600CR25	0.629	0.101	2.115	1.990
212CR22	0.116	0.073	1.035	1.450
358CR22	0.281	0.128	1.417	2.533
400CR22	0.354	0.149	1.541	2.949
600CR22	0.989	0.220	2.185	4.360
212CR20	0.147	0.095	1.007	1.871
358CR20	0.328	0.160	1.416	3.170
400CR20	0.415	0.185	1.541	3.670
600CR20	1.046	0.304	2.185	6.020

(1) Yield strength (F_y) is 33 ksi. Assumes full lateral support. For laterally unbraced structural member, see Section C3.1.2 of the 1986 AISI Design Specifications. (2) Effective properties based on 1986 AISI Design Specifications.

CR



Joist framing is typically constructed using Unimast's SJ members, 6" and greater. Smaller SJ members can be used for shorter spans and lighter loads. The following

tables contain Maximum Allowable Clear Spans (Table 8) and Maximum Allowable Uniform Loads (Table 9).



Table 8

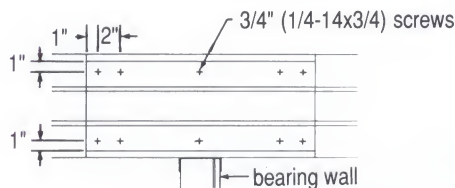
Joists: Maximum Allowable Clear Spans⁽¹⁾

Single and Double-Span

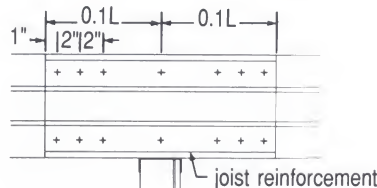
Member ⁽²⁾	Joist spacing (in)	Uniform load (psf)											
		10 dead, 20 live		10 dead, 30 live		10 dead, 40 live		10 dead, 50 live		20 dead, 40 live		20 dead, 100 live	
		1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾
60SJ20	12	15'9"	17'8"af	13'9"	15'5"bf	12'6"	14'0"bf	11'7"	12'8"bf	12'0"	12'8"bf	8'4"	
	16	14'4"	16'1"bf	12'6"	13'9"bf	11'4"	11'8"bf	10'5"	10'2"cf	10'5"	10'1"cf	6'3"	
	24	12'0"	12'8"bf	10'5"	10'1"cf	9'3"		8'4"		8'4"		4'2"	
60SJ18	12	17'3"	19'4"	15'1"	16'11"	13'8"	15'5"	12'9"	14'3"af	13'8"	15'5"bf	10'1"	11'4"cf
	16	15'8"	17'7"	13'8"	15'5"af	12'5"	14'0"bf	11'7"	13'0"bf	12'5"	14'0"bf	8'10"	
	24	13'8"	15'5"bf	12'0"	13'5"bf	10'10"	12'2"cf	10'1"	11'4"cf	10'2"	12'0"cf	7'2"	
60SJ16	12	18'8"	21'0"	16'4"	18'4"	14'10"	16'8"	13'9"	15'6"	14'10"	16'8"af	10'11"	12'3"bf
	16	17'0"	19'1"	14'10"	16'8"	13'6"	15'2"af	12'6"	14'1"af	13'6"	15'2"af	9'11"	11'2"cf
	24	14'10"	16'8"af	13'0"	14'7"af	11'9"	13'3"bf	10'11"	12'3"bf	11'6"	13'3"bf	8'1"	
60SJ14	12	20'0"	22'6"	17'6"	19'8"	15'11"	17'10"	14'9"	16'7"	15'11"	17'10"	11'9"	13'2"af
	16	18'2"	20'5"	15'11"	17'10"	14'5"	16'3"	13'5"	15'1"	14'5"	16'3"af	10'8"	11'11"bf
	24	15'11"	17'10"	13'11"	15'7"	12'7"	14'2"af	11'9"	13'2"af	12'7"	14'2"af	9'0"	10'5"cf
72SJ18	12	20'2"	22'7"	17'7"	19'9"	16'0"	17'11"	14'10"	16'8"b	16'0"	17'11"b	11'8"	12'7"cf
	16	18'3"	20'6"	16'0"	17'11"b	14'6"	16'4"b	13'6"	15'2"b	15'2"	16'4"b	9'11"	
	24	16'0"	17'11"b	13'11"	15'8"bf	12'8"	14'3"cf	11'8"	12'7"cf	11'8"	12'7"cf	8'3"	
72SJ16	12	21'10"	24'6"	19'1"	21'5"	17'4"	19'5"	16'1"	18'1"	17'4"	19'5"	12'9"	14'4"bf
	16	19'10"	22'3"	17'4"	19'5"	15'9"	17'8"	14'7"	16'5"b	15'9"	17'8"b	11'5"	13'0"cf
	24	17'4"	19'5"	15'2"	17'0"b	13'9"	15'5"bf	12'9"	14'4"bf	13'2"	15'5"cf	9'4"	
72SJ14	12	23'5"	26'3"	20'5"	22'11"	18'7"	20'10"	17'3"	19'4"	18'7"	20'10"	13'8"	15'4"
	16	21'3"	23'10"	18'7"	20'10"	16'10"	18'11"	15'8"	17'7"	16'10"	18'11"	12'5"	13'11"bf
	24	18'7"	20'10"	16'3"	18'3"	14'9"	16'7"	13'8"	15'4"	14'8"	16'7"b	10'4"	12'1"cf
80SJ18	12	21'10"	24'6"	19'1"	21'5"	17'4"	19'5"b	16'1"	18'1"b	17'4"	19'5"b	12'5"	12'8"d
	16	19'10"	22'3"	17'4"	19'5"b	15'9"	17'8"b	14'7"	16'5"d	15'3"	16'5"d	10'9"	10'0"df
	24	17'4"	19'5"b	15'2"	16'11"d	13'8"	14'5"d	12'5"	12'8"d	12'5"	12'7"d	8'0"	7'1"ef
80SJ16	12	23'8"	26'7"	20'8"	23'2"	18'9"	21'1"	17'5"	19'7"	18'9"	21'1"	13'10"	15'6"df
	16	21'6"	24'2"	18'9"	21'1"	17'1"	19'2"	15'10"	17'9"b	17'1"	19'2"b	12'3"	14'1"df
	24	18'9"	21'1"	16'5"	18'5"b	14'11"	16'9"b	13'10"	15'6"df	14'2"	16'9"df	10'0"	11'1"ef
80SJ14	12	25'4"	28'6"	22'2"	24'11"	20'2"	22'7"	18'8"	21'0"	20'2"	22'7"	14'10"	16'8"b
	16	23'1"	25'11"	20'2"	22'7"	18'4"	20'6"	17'0"	19'1"	18'4"	20'6"	13'6"	15'2"b
	24	20'2"	22'7"	17'7"	19'9"	16'0"	17'11"	14'10"	16'8"b	15'9"	17'11"b	11'2"	12'11"df
92SJ16	12	26'8"	29'11"	23'4"	26'2"	21'2"	23'9"	19'8"	22'1"b	21'2"	23'9"b	15'7"	17'6"d
	16	24'3"	27'3"	21'2"	23'9"	19'3"	21'7"b	17'10"	20'1"b	19'3"	21'7"b	13'8"	15'0"d
	24	21'2"	23'9"b	18'6"	20'9"b	16'10"	18'10"d	15'7"	17'6"d	15'9"	18'3"d	11'2"	11'2"ef
92SJ14	12	28'7"	32'2"	25'0"	28'1"	22'9"	25'6"	21'1"	23'8"	22'9"	25'6"	16'9"	18'10"b
	16	26'0"	29'2"	22'9"	25'6"	20'8"	23'2"	19'2"	21'6"	20'8"	23'2"	15'2"	17'1"b
	24	22'9"	25'6"	19'10"	22'3"	18'0"	20'3"b	16'9"	18'10"b	17'6"	20'3"b	12'5"	14'6"d
115SJ16	12	32'0"	35'11"	28'0"	31'5"	25'5"	28'6"b	23'7"	26'6"b	24'9"	28'6"b	17'6"	18'0"d
	16	29'1"	32'8"	25'5"	28'6"b	23'1"	25'11"b	21'5"	24'1"b	21'5"	24'1"b	15'2"	14'4"d
	24	24'9"	28'6"b	21'5"	24'0"b	19'2"	20'6"d	17'6"	18'0"d	17'6"	18'0"d	11'7"	10'2"d
115SJ14	12	34'4"	38'7"	30'0"	33'9"	27'3"	30'8"	25'4"	28'5"	27'3"	30'8"	20'1"	22'7"b
	16	31'3"	35'1"	27'3"	30'8"	24'9"	27'10"	23'0"	25'10"b	24'9"	27'10"b	17'11"	20'6"b
	24	27'3"	30'8"	23'10"	26'9"b	21'8"	24'4"b	20'1"	22'7"b	20'8"	24'4"b	14'8"	16'1"d
135SJ14	12	39'5"	44'3"	34'5"	38'8"	31'3"	35'1"	29'0"	32'7"	31'3"	35'1"	22'4"	25'9"b
	16	35'10"	40'2"	31'3"	35'1"	28'5"	31'11"b	26'5"	29'7"b	27'5"	31'11"b	19'4"	21'2"d
	24	31'3"	35'1"	27'4"	30'8"b	24'6"	27'10"b	22'4"	25'9"b	22'4"	25'10"b	15'10"	15'9"d

(1) Based on allowable design stress or live load deflection limitation of $L/360$, whichever is less. See Design Considerations, page 13. (2) Allowable clear spans based on SJ members with 40 ksi yield strength (F_y). All joists must be checked for web crippling (see Tables 12 and 13). Joists must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required. (3) Joist reinforcing required for a minimum distance of 0.1 span each side, total of 0.2 span, of center support. Screw attachment pattern is "a" unless other pattern is designated. See screw patterns below.

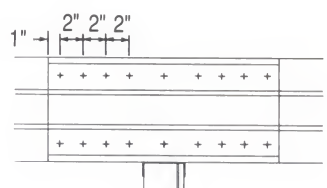
Screw Pattern "a"



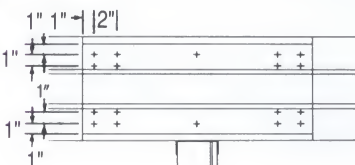
Screw Pattern "b"



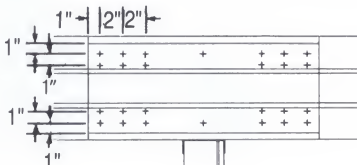
Screw Pattern "c"



Screw Pattern "d"



Screw Pattern "e"



Screw Pattern "f"



Table 9

Joists: Allowable Uniform Loads (lb/ft)⁽¹⁾

Single and Double Span

Member ⁽²⁾	Single span																	
	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'
362SJ20	46	32	24	18	14	11												
362SJ18	60	42	31	23	18	14	11											
362SJ16	76	54	39	29	23	18	14	12	10									
362SJ14	93	66	48	36	28	22	17	14	12	10								
40SJ20	57	40	29	22	17	13	11											
40SJ18	75	53	39	29	22	18	14	11										
40SJ16	95	67	49	37	28	22	18	14	12									
40SJ14	117	82	60	45	35	27	22	18	15	12	10							
60SJ20	125	106	78	59	45	36	28	23	19	16	13	11	10					
60SJ18	193	141	103	77	59	47	37	30	25	21	18	15	13	11	10			
60SJ16	247	179	131	98	76	59	48	39	32	27	22	19	16	14	12	11		
60SJ14	304	221	161	121	93	73	59	48	39	33	28	23	20	17	15	13	12	10
725SJ18	254	201	162	123	94	74	59	48	40	33	28	24	20	18	15	13	12	10
725SJ16	326	257	208	156	120	95	76	62	51	42	36	30	26	22	20	17	15	13
725SJ14	401	317	256	192	148	117	93	76	62	52	44	37	32	28	24	21	19	16
80SJ18	239	213	186	154	120	95	76	62	51	42	36	30	26	22	20	17	15	13
80SJ16	376	297	241	199	153	121	97	78	65	54	45	39	33	29	25	22	19	17
80SJ14	464	367	297	245	189	149	119	97	80	66	56	48	41	35	31	27	24	21
925SJ16	417	369	299	247	208	173	138	113	93	77	65	55	47	41	36	31	27	24
925SJ14	577	456	369	305	256	213	171	139	114	95	80	68	59	51	44	39	34	30
115SJ16	347	308	277	252	231	213	187	163	143	127	113	96	82	71	62	54	48	42
115SJ14	677	602	514	425	357	304	262	229	198	165	139	118	101	88	76	67	59	52
135SJ14	587	522	470	427	392	355	306	267	234	208	185	166	150	132	115	101	88	78
Member ⁽²⁾	Double span																	
	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'
362SJ20	65	46	33	25	19	15	12	10										
362SJ18	86	60	44	33	25	20	16	13	11									
362SJ16	108	76	55	42	32	25	20	16	13	11								
362SJ14	132	93	68	51	39	31	25	20	17	14	12	10						
40SJ20	81	57	42	31	24	19	15	12	10									
40SJ18	107	75	55	41	32	25	20	16	13	11								
40SJ16	135	95	69	52	40	31	25	20	17	14	12	10						
40SJ14	165	116	85	64	49	38	31	25	21	17	14	12	11					
60SJ20	107	93	82	72	64	50	40	33	27	22	19	16	14	12	10			
60SJ18	222	187	145	109	84	66	53	43	35	30	25	21	18	16	14	12	11	9
60SJ16	323	254	185	139	107	84	67	55	45	38	32	27	23	20	17	15	13	12
60SJ14	398	312	228	171	132	104	83	67	56	46	39	33	28	25	21	19	16	15
725SJ18	218	188	164	145	129	105	84	68	56	47	40	34	29	25	22	19	17	15
725SJ16	377	319	272	221	170	134	107	87	72	60	50	43	37	32	28	24	21	19
725SJ14	524	414	335	272	210	165	132	107	88	74	62	53	45	39	34	30	26	23
80SJ18	209	183	161	143	128	115	104	87	72	60	50	43	37	32	28	24	21	19
80SJ16	376	322	279	244	214	171	137	111	92	76	64	55	47	40	35	31	27	24
80SJ14	606	479	388	321	268	210	168	137	113	94	79	67	58	50	43	38	33	30
925SJ16	361	314	276	244	218	196	177	159	131	109	92	78	67	58	50	44	39	34
925SJ14	628	534	459	398	335	285	242	197	162	135	114	97	83	72	62	55	48	42
115SJ16	315	277	246	221	199	181	166	152	140	129	120	112	104	97	87	76	67	59
115SJ14	591	515	453	403	360	324	293	267	243	223	197	168	144	124	108	94	83	74
135SJ14	532	467	415	372	335	305	278	255	235	217	201	187	174	162	152	142	125	111

(1) Based on allowable design stress or total load deflection limitation of $L/360$, whichever is less. See Design Considerations, page 13. (2) Allowable clear spans based on SJ members with 40 ksi yield ksi strength (F_y). All joists must be checked for web crippling (see Tables 12 and 13). Joists must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist stiffeners may be required.



The following conditions have been considered in developing tabular data for joist allowable clear spans and loads (Tables 8 and 9):

1. Bending Stress
2. Shear Stress
3. Combined bending and shear stress
4. Web crippling
5. Combined bending and web crippling
6. Deflection

Calculations are based on the following factors:

1. AISI "Specifications for the Design of

Cold-Formed Steel Structural Members", 1986 edition.

2. Yield strength: 40,000 psi (40 ksi) for SJ joists, 33,000 psi (33 ksi) for CR runners (Contact the Technical Service Departments for information of 33 ksi and 50 ksi SJ joists).
3. Compression flange fully braced.
4. Structural and physical properties for members shown in Tables 2, 3 and 4.
5. Joists to have a minimum of 10 " unpunched steel at the end supports.
6. Double-span systems assume screw-attached joist reinforcement for a minimum distance of 0.1 span each side (total 0.2 span) of center support.



Table 10

Headers: Allowable Uniform Loads (lb/ft) Boxed Configuration

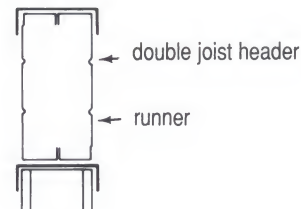
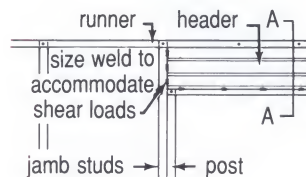
Span (ft)	60SJ				725SJ		
	20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
4	490	1160	1982	2438	1013	1989	3187
6	327	656	881	1083	676	1108	1416
8	245	369	495	609	456	623	797
10	156	205	261	322	292	399	510
12	90	119	151	186	189	240	295
14	57	75	95	117	119	151	186

Span (ft)	80SJ			925SJ		115SJ		135SJ
	18 gauge	16 gauge	14 gauge	16 gauge	14 gauge	16 gauge	14 gauge	14 gauge
4	940	1844	3606	1642	3209	1367	2671	2321
6	627	1230	1628	1095	1949	911	1780	1547
8	470	700	916	821	1096	684	1335	1160
10	324	448	586	529	702	547	911	928
12	225	307	378	367	487	456	633	759
14	152	193	238	270	342	341	465	558

Uniform load values are for headers made of two boxed unpunched SJ sections, with stiffened end conditions, as shown. Maximum total load deflection is limited to $L/360$. Header sections must be checked for web crippling under concentrated loads and at end supports (see Tables 12 and 13).

Header detail

(Section A-A)



JOISTS: Web Stiffening

Web stiffeners provide added reinforcement for SJ members under concentrated loads or at reactions at points of bearing. Web stiffeners increase load carrying capacity by preventing web crippling. Based on 1986 AISI Design Specifications, web stiffening is required for joists under certain critical load conditions (see Maximum Web Crippling Load Tables 12 and 13). A stiffener is also required at points of reaction or concentrated load when the center of a web punchout is less than 10" from the edge of bearing.

Table 11

Web Crippling: Maximum Allowable Loads⁽¹⁾ Joist Web Stiffener

Joist style & gauge	Allowable load ⁽¹⁾ (lb/2 piece web stiffener)
SJ14	9000
SJ16	8500
SJ18, 20	7000

Allowable loads based on 3 1/2" minimum bearing.

The Unimast Web Stiffener consists of two identical steel sections which, when mated and screw-attached to the joist web, enable Unimast steel joists to carry the maximum allowable loads shown in Table 11.

In a continuous span condition, joists properly screw-attached back-to-back provide the resistance to web crippling loads as shown in Table 13. Values are based on properly connected joist reinforcing of a separate joist section or lapped reinforcement. See AISI Design Specifications, Sections C3.4 and C3.5 for allowable web crippling loads; Section D1.1 for proper connections; Section E3.1 for minimum spacing and edge distance of screws.

Table 12

Web Crippling: Maximum Allowable Loads (lbs)

Single Joist

Member	Inside depth "h" (in)	Condition 1				Condition 2				Condition 3				Condition 4			
		Bearing length															
		1¼"	3½"	4"	6"	1¼"	3½"	4"	6"	1¼"	3½"	4"	6"	1¼"	3½"	4"	6"
135SJ14	13.272	850	1069	1118	1312	1560	1854	1919	2281	543	683	714	839	1299	1349	1360	1404
115SJ14	11.272	912	1147	1200	1409	1636	1944	2013	2392	602	757	791	929	1511	1569	1581	1633
115SJ16	11.301	520	681	717	861	985	1212	1277	1593	327	429	452	542	764	801	809	841
925SJ14	9.022	982	1236	1292	1517	1721	2046	2118	2517	667	840	878	1031	1749	1816	1831	1891
925SJ16	9.051	575	754	794	953	1054	1296	1366	1705	379	497	523	628	952	998	1008	1048
80SJ14	7.772	1021	1285	1343	1577	1769	2102	2177	2586	704	886	926	1088	1881	1954	1970	2034
80SJ16	7.801	606	794	836	1004	1092	1343	1416	1767	408	535	563	676	1057	1107	1118	1163
80SJ18	7.825	347	477	506	621	664	872	937	1195	226	310	329	404	559	592	599	629
725SJ14	7.022	1044	1314	1374	1613	1797	2136	2212	2628	726	913	955	1122	1961	2036	2053	2120
725SJ16	7.051	624	818	862	1034	1115	1372	1446	1804	425	558	587	705	1120	1173	1185	1232
725SJ18	7.075	362	496	526	646	682	897	963	1228	239	328	348	428	608	644	652	684
60SJ14	5.772	1083	1363	1425	1674	1845	2193	2270	2697	763	959	1003	1178	2093	2174	2191	2263
60SJ16	5.801	665	859	904	1085	1154	1419	1495	1886	454	595	627	753	1224	1282	1295	1347
60SJ18	5.825	386	529	561	689	713	937	1007	1284	262	359	381	468	690	731	740	776
60SJ20	5.849	186	272	291	368	378	553	600	786	121	177	190	239	307	331	336	357

Allowable loads based on SJ members with 40 ksi yield strength (Fy). Allowable loads for conditions shown in details are for web crippling only and apply to joists with solid web at reaction points. See AISI 1986 Design Specifications, Sections C3.4 and C3.5, for calculating maximum allowable combined bending and web crippling loads and Section D1.1 for connections to achieve these loads. SJ members must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required.

Table 13

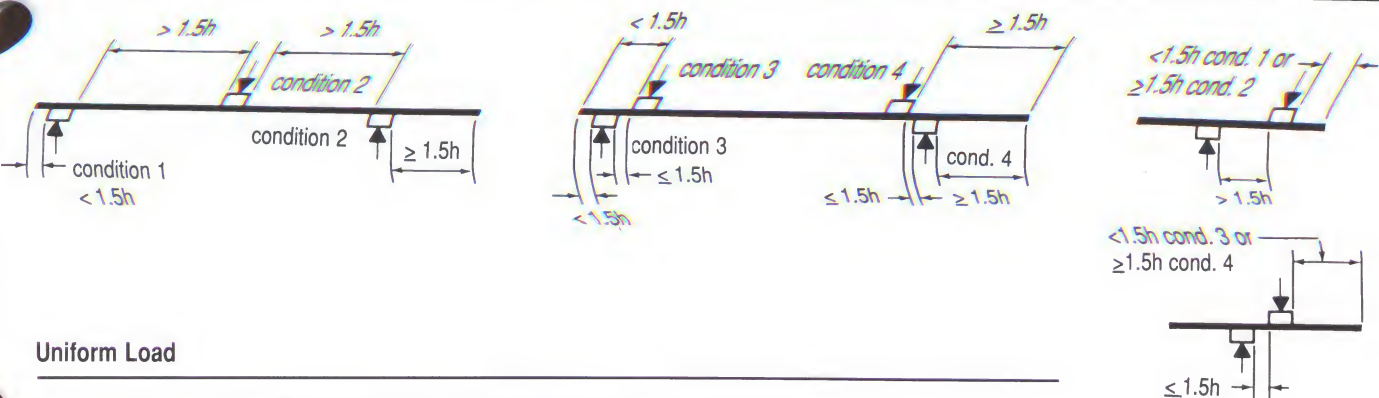
Web Crippling: Maximum Allowable Loads (lbs)

Joists Back-To-Back

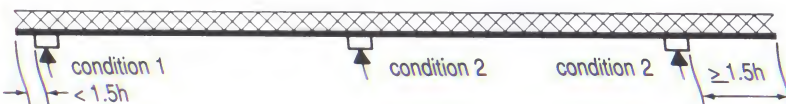
Member	Inside depth "h" (in)	Condition 1				Condition 2				Condition 3				Condition 4			
		Bearing length															
		1¼"	3½"	4"	6"	1¼"	3½"	4"	6"	1¼"	3½"	4"	6"	1¼"	3½"	4"	6"
135SJ14	13.272	4059	4989	5148	5703	4077	5368	5590	6361	2051	2520	2601	2881	4213	5547	5777	6574
115SJ14	11.272	4059	4989	5148	5703	4077	5368	5590	6361	2133	2621	2705	2997	4416	5816	6056	6891
115SJ16	11.301	2705	3371	3485	3883	2844	3798	3962	4531	1257	1566	1619	1804	2705	3613	3769	4311
925SJ14	9.022	3927	4827	4981	5518	4077	5368	5590	6361	2225	2734	2822	3126	4645	6117	6370	7249
925SJ16	9.051	2705	3371	3485	3883	2844	3798	3962	4531	1328	1655	1711	1907	2893	3863	4030	4610
80SJ14	7.772	3852	4734	4885	5412	4077	5368	5590	6361	2276	2797	2887	3198	4773	6285	6544	7448
80SJ16	7.801	2647	3298	3410	3799	2844	3798	3962	4531	1368	1705	1763	1964	2997	4003	4175	4776
80SJ18	7.825	1803	2279	2361	2645	1971	2670	2790	3207	821	1038	1075	1204	1867	2528	2642	3037
725SJ14	7.022	3806	4678	4828	5348	4077	5368	5590	6361	2307	2835	2926	3241	4849	6386	6649	7567
725SJ16	7.051	2609	3251	3361	3744	2844	3798	3962	4531	1392	1735	1794	1998	3059	4086	4262	4875
725SJ18	7.075	1799	2274	2356	2639	1971	2670	2790	3207	840	1062	1100	1232	1918	2598	2715	3121
60SJ14	5.772	3731	4585	4732	5242	4077	5368	5590	6361	2358	2898	2991	3313	4976	6553	6824	7765
60SJ16	5.801	2546	3173	3280	3654	2844	3798	3962	4531	1432	1784	1845	2055	3164	4225	4408	5042
60SJ18	5.825	1747	2208	2287	2562	1971	2670	2790	3207	871	1101	1141	1278	2004	2715	2837	3261
60SJ20	5.849	1079	1388	1441	1626	1231	1696	1776	2054	463	596	618	698	1110	1530	1602	1853

Allowable loads based on SJ members with 40 ksi yield strength (Fy). Allowable loads for conditions shown in details are for web crippling only and apply to joists with solid web at reaction points. See AISI 1986 Design Specifications, Section C3.4 and C3.5, for calculating maximum allowable combined bending and web crippling loads and Section D1.1 for connections to achieve these loads. SJ members must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required.

Concentrated Loads



Uniform Load



Lateral support to prevent joists from twisting is provided by the plywood subfloor or deck material on the top flanges and bridging consisting of solid blocking and strap bracing or 1 1/2" cold-rolled channels screw-attached or welded to bottom joist flanges. Spacing of joist bridging is based on the actual stress in the joists and must be calculated.

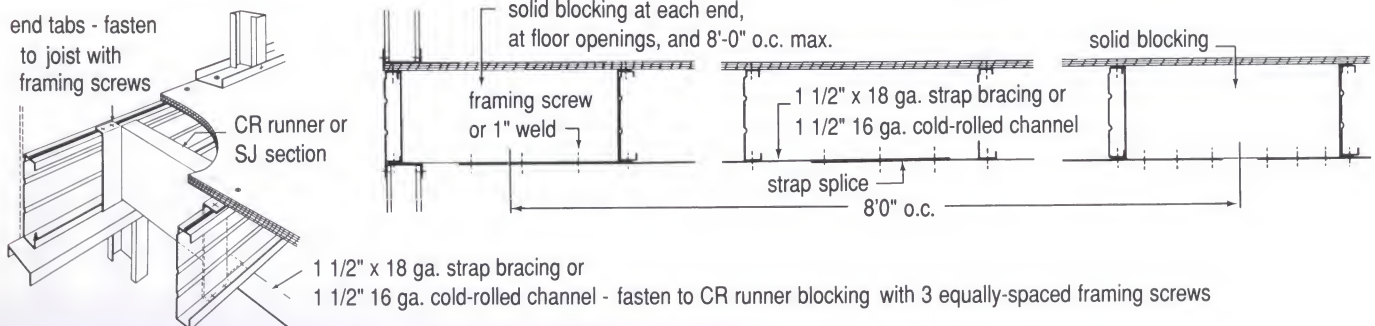
Solid blocking, a field cut CR runner or SJ joist section, is placed between outer joists, over all interior supports, adjacent to openings, and at a maximum of 8' o.c. Blocking is welded or screw-attached to joists. Cold-rolled channels or strap bracing of 1 1/2" x 18 gauge corrosion-

resistant steel is screw-attached to bottom joist flange between solid blocking.

Where sub-floors or decking do not provide lateral support, joists must be properly braced at all bearing points and at intervals within spans to provide lateral support to top flanges. For joists in continuous span conditions, portions of the bottom flanges are in compression and must be laterally braced, based on design requirements.

Joist bridging should be installed immediately after joists are erected and before construction loads are applied to prevent flange rotation during construction and to support flanges in compression.

Joist bridging



JOISTS: Other Conditions

Table 14

Joist End Clip: Maximum Allowable Load

Clip length (in)	No. of screws (each leg)	Allowable load (lb/clip)
6	3	560
8	4	890
10	5	980

Allowable loads based on Unimast 2" x 2" 14 gauge end clips attached with 1/2" Type S-12 screws of quantity shown into SJ member of .0359" thickness and 40 ksi yield strength (Fy).

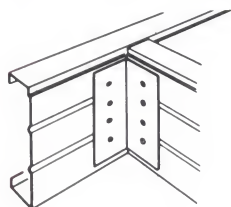
Table 15

Pipe Opening: Maximum Pipe Opening and Web Reinforcement

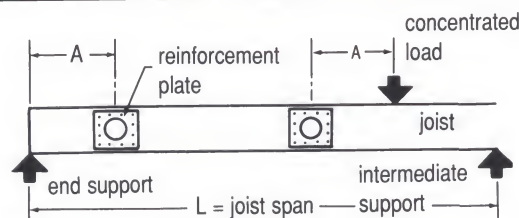
Joists size	"d" max. hole dia. (in)	"b" plate size (in)	"a" hole spacing (in)	"c" end dist. (in)	"A" min. distance to concentrated load or support (1'0" min.)
115SJ	6 7/8	9	2 3/4	9 1/4	L/6
925SJ	5 1/2	9	2 3/4	1 5/8	L/25
80SJ	4 1/4	7	1 7/8	1 1/4	L/16
725SJ	4 1/4	7	1 7/8	1 1/4	L/16
60SJ	3 1/2	5 1/4	1 7/8	1 5/8	L/10

Plate thickness is 14 gauge (.0710" minimum thickness).

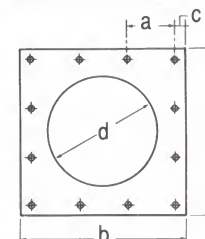
Joist end clip



Pipe opening reinforcement



Reinforcement plate



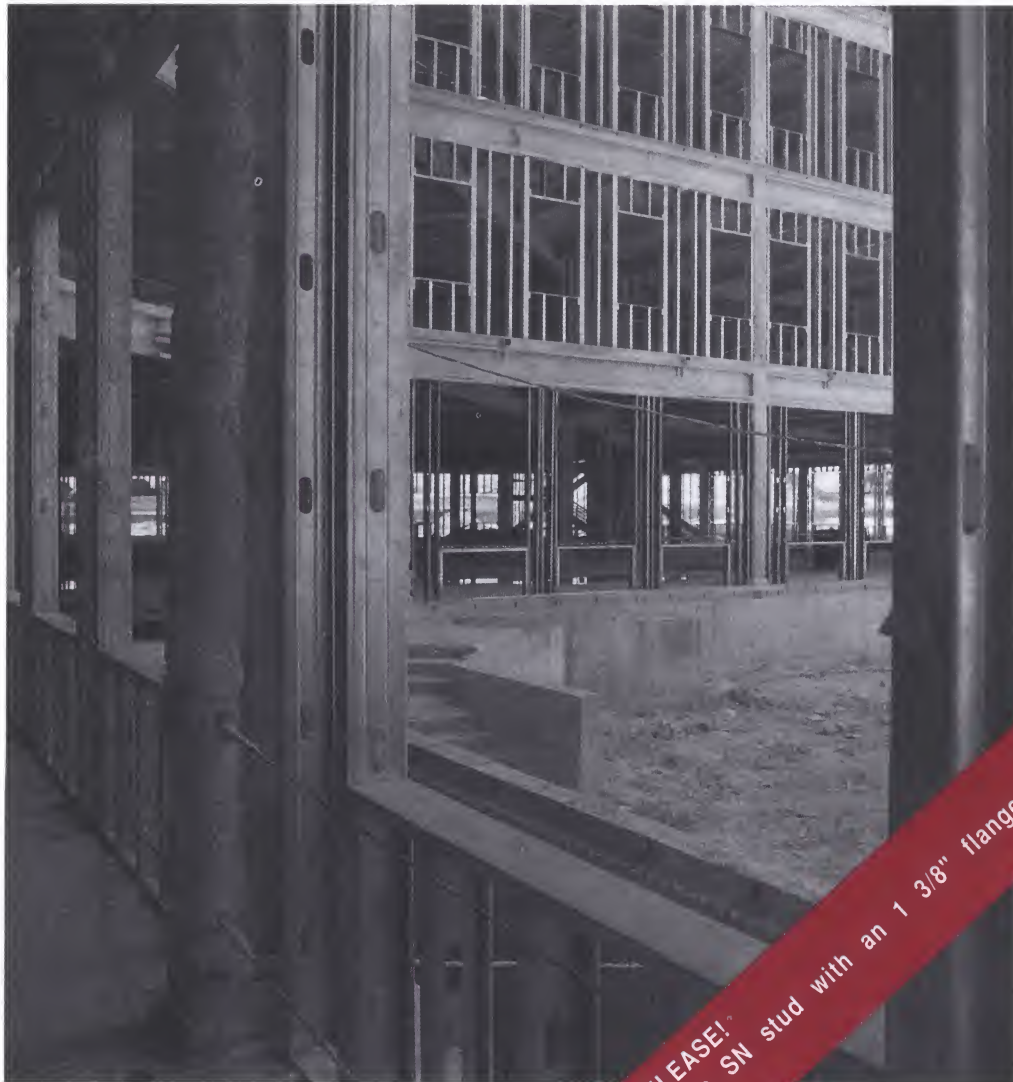
Unimast manufactures two primary categories of studs:

SJ - for use in load bearing and curtain wall applications, as well as tall wall applications. (Tall walls are not addressed in this literature. Contact the Unimast Technical Departments for information.)

ST- 25, 22 and 20 gauge studs used in interior non-load bearing applications.

The 20 gauge ST members may be used in non-load bearing curtain wall applications.

The following tables are organized by use. Maximum Allowable Axial Loads are addressed in Tables 16-23. Limiting Heights for Curtain Wall are addressed in Tables 24-29 and Limiting Heights for Interior Partitions are addressed in Tables 30-31.



NEW PRODUCT RELEASE!
Unimast announces its SN stud with an 1 3/8" flange for curtain wall!
See page 46.

Axial load bearing studs are designed to carry both vertical loads and lateral loads. Unimast manufactures the SJ stud for use in axial load bearing conditions. The ST members are not designed to carry axial loads. The following tables contain allowable axial loads for specific heights and conditions based on AISI 1986

Specifications. Table 16 contains allowable axial construction loads with no wind or lateral loads. This condition occurs during construction prior to the application of sheathing and finish materials. Tables 17-24 contain allowable axial loads for various lateral loadings; 5 psf, 15 psf, 20 psf, 25 psf, 30 psf, 35 psf and 40 psf.

SJ (3 5/8", 4")



Table 16

0 psf

SJ Studs: Allowable Axial Loads (lbs)

Construction Loads

Height (ft)	Bracing	362 SJ (3 5/8")				40 SJ (4")			
		20	18	16	14	20	18	16	14
8	none	977	1338	1904	2497	890	1368	2177	3044
	mid-pt	2758	3522	4498	5325	2479	3576	5112	6970
	1/3 pt	3388	4298	5327	6240	2970	4265	5946	8042
9	none	795	1109	1596	1973	722	1129	1816	2405
	mid-pt	2322	2985	3887	4645	2155	3124	4532	6223
	1/3 pt	3108	3943	4901	5744	2769	3976	5124	6578
10	none	665	945	1374	1598	602	957	1472	1948
	mid-pt	1898	2455	3240	3922	1800	2630	3901	5420
	1/3 pt	2797	3550	4429	5197	2544	3655	4650	5639
11	none	568	823	1152	1321	513	830	1216	1610
	mid-pt	1581	2056	2721	3316	1498	2200	3281	4607
	1/3 pt	2454	3118	3911	4599	2298	3303	4650	6307
12	none	495	730	968	1110	445	704	1022	1353
	mid-pt	1339	1752	2325	2853	1268	1873	2801	3961
	1/3 pt	2089	2659	3354	3956	2028	2920	4135	5623
14	none	6392	553	711	815	350	518	751	994
	mid-pt	1022	1326	1770	2201	948	1415	2130	3053
	1/3 pt	1542	1971	2490	2952	1509	2181	3108	4251
16	none	783	1049	1407	1770	739	1117	1691	2455
	mid-pt	1188	1524	1929	2297	1162	1685	2406	3307
	1/3 pt								
18	none	632	857	1155	1467	596	912	1388	2037
	mid-pt	945	1217	1543	1846	923	1345	1924	2657
	1/3 pt								
20	none	524	719	973	1244	494	764	1169	1730
	mid-pt	770	997	1266	1521	753	1101	1578	2188
	1/3 pt								

SJ (6", 7 1/4", 8")



Height (ft)	Bracing	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20	18	16	14	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	none	1219	1728	2531	3364	1542	2374	3310	1464	2420	3589
	mid-pt	3448	4957	6980	9437	4634	6850	9715	4520	7169	10813
	1/3 pt	3961	5725	7972	10846	5496	8026	11438	5408	8464	12834
9	none	963	1365	2000	2658	1218	1876	2616	1156	1912	2835
	mid-pt	3175	4555	6453	8702	4222	6288	8891	4095	6550	9847
	1/3 pt	3825	5529	7712	10494	5313	7776	11072	5219	8189	12404
10	none	780	1106	1620	2153	987	1519	2119	937	1549	2297
	mid-pt	2870	4105	5864	7880	3762	5659	7971	3621	5857	8768
	1/3 pt	3674	5310	7424	10104	5108	7497	10663	5009	7881	11925
11	none	645	914	1339	1779	815	1256	1751	774	1280	1898
	mid-pt	2533	3608	5212	6972	3253	4965	6953	3096	5092	7575
	1/3 pt	3508	5070	7107	9678	4882	7188	10211	4775	7541	11394
12	none	542	768	1125	1495	685	1055	1471	651	1075	1595
	mid-pt	2166	3072	4499	5980	2741	4221	5885	2602	4301	6380
	1/3 pt	3326	4809	6763	9217	4634	6850	9715	4520	7169	10813
14	none	398	564	826	1098	503	775	1081	790	1172	1722
	mid-pt	1592	2257	3305	4394	2013	3101	4324	1912	3160	4687
	1/3 pt	2917	4223	5995	8196	4074	6086	8595	3943	6327	9500
16	none	1219	1728	2531	3364	1542	2374	3310	1464	2420	3589
	mid-pt	2249	3558	5126	7050	3428	5204	7303	3277	5356	7985
	1/3 pt										
18	none	963	1365	2000	2658	1218	1876	2616	1156	1912	2835
	mid-pt	1962	2864	4182	5805	2741	4221	5885	2602	4301	6380
	1/3 pt										
20	none	780	1106	1620	2153	987	1519	2119	937	1549	2297
	mid-pt	1598	2343	3429	4787	2220	3419	4767	2108	3484	5167
	1/3 pt										

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Allowable axial loads based on various bracing conditions: none -- studs unbraced; mid-pt -- mechanical bracing at the mid-point of the stud clear height; 1/3 pt -- mechanical bracing at third points of stud clear height. See Design Considerations, page 34.

Table 17

5 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Interior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	3143	4015	5164	6118	2722	3929	5650	7708
	16	3143	4015	5164	6118	2722	3929	5650	7708
	24	3143	4015	5164	6118	2722	3929	5650	7708
9	12	3142	4014	5163	6117	2722	3929	5649	7707
	16	3142	4014	5163	6117	2722	3929	5649	7707
	24	2911	4014	5163	6117	2722	3929	5649	7707
10	12	3142	4013	5162	6116	2722	3928	5648	7706
	16	2928	4013	5162	6116	2722	3928	5648	7706
	24	2528	3617	4978	6116	2530	3906	5648	7706
11	12	2816	3900	5160	6114	2721	3927	5647	7705
	16	2564	3620	4929	6114	2606	3927	5647	7705
	24	2141	3147	4395	5589	2244	3517	5257	7268
12	12	2458	3456	4673	5857	2571	3866	5589	7523
	16	2203	3168	4349	5501	2341	3583	5240	7107
	24	1776*	2686	3805	4905	1947	3103	4651	6409
14	12	1815	2615	3569	4534	2048	3095	4410	5831
	16	1574*	2345	3272	4208	1801	2800	4071	5457
	24	1163†	1884*	2762	3648	1385*	2304	3495	4811
16	12	1319*	1953*	2698	3463	1567*	2392	3395	4466
	16	1095†	1705*	2431*	3174	1326*	2114*	3090	4139
	24	705†	1274†	1961*	2664*	919†	1639*	2557*	3557*
18	12	951†	1459*	2051*	2663	1176*	1831*	2618	3452
	16	740†	1229†	1807*	2401*	946†	1573*	2339*	3157*
	24	368†	821†	1367†	1928†	554†	1123†	1843†	2621*
20	12	677†	1090†	1571†	2069*	870†	1400†	2031*	2700*
	16	475†	872†	1341†	1824†	651†	1156†	1772†	2426*
	24	116 +	481 +	924†	1377†	272 +	727†	1303†	1922†

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")				80 SJ (8")			
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	12 gauge	18 gauge	16 gauge	14 gauge	12 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	16	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	24	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
9	12	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	16	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	24	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
10	12	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	16	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	24	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
11	12	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	16	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	24	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
12	12	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	16	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	24	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
14	12	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	16	3447	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	24	3132	4875	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
16	12	3400	4957	6979	9436	4634	6849	9715	1303	4520	7168	10813	14513
	16	3110	4780	6974	9436	4634	6849	9715	1303	4520	7168	10813	14513
	24	2602	4167	6231	8649	4634	6849	9715	1303	4520	7168	10813	14513
18	12	2947	4487	6459	8699	4634	6849	9715	1303	4520	7168	10813	14513
	16	2620	4091	5985	8144	4634	6849	9715	1303	4520	7168	10813	14513
	24	2066	3424	5189	7213	4247	6634	9603	4520	7168	10813	14513	19293
20	12	2478	3805	5462	7297	4634	6849	9715	1303	4520	7168	10813	14513
	16	2140	3403	4997	6775	4332	6637	9439	4520	7168	10813	14513	19293
	24	1572*	2728*	4212	5883	3695	5836	8434	4088	6790	10293	14513	19293

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 34.

SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 18

15 psf

SJ Studs: Allowable Axial Loads

Exterior Wall

Height (ft.)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")					
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge		
8	12	2873	4015	5164	6118	2722	3929	5650	7708		
	16	2527	3669	5106	6118	2462	3883	5650	7708		
	24	1910	3013	4395	5659	1971	3307	5198	7455		
9	12	2457	3569	4967	6117	2436	3826	5649	7707		
	16	2059	3139	4492	5743	2114	3443	5310	7525		
	24	1372*	2388	3661	4866	1536	2755	4472	6512		
10	12	2028	3066	4363	5583	2115	3406	5200	7306		
	16	1601*	2592	3832	5015	1747	2963	4655	6645		
	24	877*	1786*	2928	4041	1104*	2189	3712	5509		
11	12	1620*	2563	3737	4875	1782	2956	4566	6432		
	16	1180*	2070*	3181	4269	1382*	2472	3975	5723		
	24	442†	1239*	2244*	3247*	698†	1647*	2974	4527		
12	12	1252*	2095*	3140	4174	1456*	2507	3929	5554		
	16	810†	1597*	2578*	3558	1038*	2002*	3318	4833		
	24		761†	1636†	2525*	332†	1149†	2293*	3624*		
14	12	653†	1312†	2124*	2948*	877†	1696*	2782*	3999		
	16	220†	824†	1580†	2351*	448†	1182†	2178*	3305*		
	24			659†	1340†		321†	1161†	2129†		
16	12	214†	727†	1360†	2009†	417†	1049†	1882†	2805*		
	16		256†	839†	1440†		547†	1302†	2148†		
	24				466†			313†	1019†		
18	12		295 +	795†	1310†		554†	1203†	1915†		
	16			294 +	765†			644†	1290†		
	24								202†		
20	12			373 +	786†		177 +	689†	1249†		
	16				260 +			149 +	648†		
	24										
Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3177	4957	6979	9436	4634	6849	9715	4520	7168	10813
10	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3368	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2817	4603	6979	9436	4634	6849	9715	4520	7168	10813
11	12	3423	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3076	4880	6979	9436	4634	6849	9715	4520	7168	10813
	24	2427	4133	6436	9208	4541	6849	9715	4520	7168	10813
12	12	3161	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2757	4489	6817	9436	4634	6849	9715	4520	7168	10813
	24	2020	3629	5807	8420	4198	6767	9715	4410	7168	10813
14	12	2573	4212	6403	9013	4634	6849	9715	4520	7168	10813
	16	2076	3621	5697	8167	4249	6780	9715	4474	7168	10813
	24	1205*	2585	4463	6698	3427	5782	8768	3773	6620	10495
16	12	1959	3394	5301	7536	4140	6583	9664	4407	7168	10813
	16	1405*	2730	4506	6591	3587	5902	8811	3933	6762	10574
	24	461†	1599*	3159*	4997	2594	4682	7298	3054	5613	9055
18	12	1382*	2603*	4214	6071	3523	5731	8466	3903	6641	10273
	16	803†	1909*	3391*	5109	2882	4937	7479	3329	5882	9262
	24		744†	2011*	3494*	1765*	3564	5786	2297	4533	7495
20	12	878†	1901*	3246*	4775*	2886	4831	7191	3352	5806	8985
	16	292†	1204†	2428*	3833*	2188*	3971	6138	2697	4946	7861
	24			1054†	2242†	997†	2513*	4363*	1552*	3460*	5948

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 34.

Table 19

20 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	2527	3669	5106	6118	2462	3883	5650	7708
	16	2106	3223	4623	5895	2129	3493	5422	7708
	24	1365*	2427	3755	4993	1520	2777	4561	6692
9	12	2059	3139	4492	5743	2114	3443	5310	7525
	16	1588	2625	3924	5144	1720	2975	4739	6834
	24	781*	1737*	2937	4094	1021*	2141	3728	5618
10	12	1601*	2592	3832	5015	1747	2963	4655	6645
	16	1103*	2038*	3211	4347	1307*	2434	4009	5866
	24	262†	1099*	2156*	3206	545†	1518*	2899	4535
11	12	1180*	2070*	3181	4269	1382*	2472	3975	5723
	16	672†	1498*	2536*	3566	913*	1905*	3287	4901
	24		538†	1454†	2384*	113†	942†	2123*	3516*
12	12	810†	1597*	2578*	3558	1038*	2002*	3318	4833
	16	300†	1022†	1930*	2847*	552†	1415*	2613*	4001
	24			842†	1654†		429†	1429†	2604*
14	12	220†	824†	1580†	2351*	448†	1182†	2178*	3305*
	16		259†	947†	1656†		590†	1478†	2497*
	24				483†			300†	1129†
16	12		256†	839†	1440†		547†	1302†	2148†
	16			227†	772†			623†	1374†
	24								
18	12			294 +	765†			644†	1290†
	16				119 +				545†
	24								
20	12				260 +			149 +	648†
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")				80 SJ (8")			
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge		18 gauge	16 gauge	14 gauge	
8	12	3447	4957	6979	9436	4634	6849	9715		4520	7168	10813	
	16	3447	4957	6979	9436	4634	6849	9715		4520	7168	10813	
	24	3150	4957	6979	9436	4634	6849	9715		4520	7168	10813	
9	12	3447	4957	6979	9436	4634	6849	9715		4520	7168	10813	
	16	3325	4957	6979	9436	4634	6849	9715		4520	7168	10813	
	24	2743	4537	6956	9436	4634	6849	9715		4520	7168	10813	
10	12	3368	4957	6979	9436	4634	6849	9715		4520	7168	10813	
	16	2997	4807	6979	9436	4634	6849	9715		4520	7168	10813	
	24	2298	4010	6326	9116	4429	6849	9715		4520	7168	10813	
11	12	3076	4880	6979	9436	4634	6849	9715		4520	7168	10813	
	16	2637	4375	6718	9436	4634	6849	9715		4520	7168	10813	
	24	1829	3441	5630	8262	4034	6593	9715		4263	7168	10813	
12	12	2757	4489	6817	9436	4634	6849	9715		4520	7168	10813	
	16	2256	3905	6132	8805	4402	6849	9715		4520	7168	10813	
	24	1354	2850	4890	7338	3603	6057	9186		3906	6845	10813	
14	12	2076	3621	5697	8167	4249	6780	9715		4474	7168	10813	
	16	1480*	2913	4853	7161	3693	6105	9166		4002	6916	10813	
	24	446†	1683*	3391	5427	2669	4863	7636		3110	5765	9377	
16	12	1405*	2730	4506	6591	3587	5902	8811		3933	6762	10574	
	16	757†	1953*	3580	5494	2911	5071	7779		3338	5983	9542	
	24		637†	2015*	3647*	1708*	3599	5965		2247	4567	7690	
18	12	803†	1909*	3391*	5109	2882	4937	7479		3329	5882	9262	
	16	133†	1107†	2441*	3997*	2118*	3996	6317		2627	4962	8053	
	24			848†	2132†	796†	2378*	4335*		1378*	3344	5958	
20	12	292†	1204†	2428*	3833*	2188*	3971	6138		2697	4946	7861	
	16		398†	1483†	2739†	1370*	2969*	4917		1914*	3927	6547	
	24				894†		1275†	2862*		556†	2180*	4318*	

Allowable axial loads based on SJ members with 40 ksi yield strength (F_y). Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 34.

SJ (6", 7 1/4", 8")

SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 20

25 psf

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	2208	3331	4740	6015	2210	3588	5537	7708
	16	1722	2811	4175	5431	1816	3126	4980	7193
	24	871*	1891	3167	4376	1101	2284	3968	5984
9	12	1701	2748	4061	5288	1816	3088	4877	7001
	16	1167*	2162	3410	4599	1358	2543	4215	6203
	24	254†	1153*	2286*	3397	552*	1581*	3052	4809
10	12	1221*	2170	3359	4506	1412*	2560	4164	6052
	16	662†	1546	2659	3750	910*	1956	3429	5170
	24		491†	1472*	2463*		916*	2172*	3667
11	12	793†	1634*	2689*	3733	1025*	2040*	3451	5096
	16	224†	994†	1968*	2946*	494†	1401*	2677*	4174
	24			756†	1621†		317†	1370*	2624*
12	12	421†	1158†	2084*	3016*	688†	1555*	2780*	4198
	16		515†	1359†	2221*	123†	898†	1991*	3267*
	24			143†	887†			666†	1706†
14	12		393†	1097†	1821†		730†	1644†	2689*
	16			386†	1041†			860†	1780†
	24								244†
16	12			373†	931†		102†	784†	1559†
	16				175†				682†
	24								
18	12				274 +			143 +	724†
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (6")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3380	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2811	4629	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3400	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3030	4861	6979	9436	4634	6849	9715	4520	7168	10813
	24	2326	4065	6417	9254	4448	6849	9715	4520	7168	10813
10	12	3088	4911	6979	9436	4634	6849	9715	4520	7168	10813
	16	2641	4402	6777	9436	4634	6849	9715	4520	7168	10813
	24	1806	3446	5674	8358	4017	6592	9715	4241	7168	10813
11	12	2744	4499	6861	9436	4634	6849	9715	4520	7168	10813
	16	2223	3897	6161	8885	4370	6849	9715	4520	7168	10813
	24	1272	2793	4874	7375	3543	6011	9163	3847	6792	10813
12	12	2378	4047	6298	9002	4505	6849	9715	4520	7168	10813
	16	1791	3361	5492	8048	3996	6527	9715	4240	7168	10813
	24	743*	2132	4046	6342	3035	5376	8357	3418	6222	10067
14	12	1623*	3082	5055	7402	3829	6270	9370	4118	7066	10813
	16	942*	2272*	4091	6257	3168	5468	8380	3548	6329	10114
	24		873*	2430*	4291	1963	4007	6587	2480	4956	8325
16	12	911*	2138*	3800	5755	3075	5271	8027	3483	6172	9792
	16	181†	1263*	2759*	4525*	2288	4308	6837	2778	5254	8585
	24			1003†	2456*	901*	2616*	4760	1498*	3601	6440
18	12	292†	1297†	2667*	4260*	2301*	4221	6594	2797	5183	8343
	16		400†	1604†	3017*	1429*	3152*	5280	1980*	4122	6961
	24				932†		1320*	3046*	541*	2268*	4580
20	12		589†	1707†	2998*	1565*	3207*	5206	2102*	4170	6859
	16			649†	1771†	642†	2081*	3838*	1206*	3014*	5379
	24							1537†		1039†	2875*

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 34.

Table 21

30 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1910	3013	4395	5659	1971	3307	5198	7455
	16	1365*	2427	3755	4993	1520	2777	4561	6692
	24	417*	1395*	2621	3800	709*	1820	3411	5320
9	12	1372*	2388	3661	4866	1536	2755	4472	6512
	16	781*	1737*	2937	4094	1021*	2141	3728	5618
	24		620*	1690*	2757*	119†	1064*	2429	4065
10	12	877*	1786*	2928	4041	1104*	2189	3712	5509
	16	262†	1099*	2156*	3206	545†	1518*	2899	4535
	24			851†	1788*		367†	1509*	2878*
11	12	442†	1239*	2244*	3247*	698†	1647*	2974	4527
	16		538†	1454†	2384*	113†	942†	2123*	3516*
	24			125†	931†			688†	1816*
12	12		761†	1636†	2525*	332†	1149†	2293*	3624*
	16			842†	1654†		429†	1429†	2604*
	24				193†				894†
14	12			659†	1340†		321†	1161†	2129†
	16				483†			300†	1129†
	24								
16	12				466†			313†	1019†
	16								
	24								
18	12								202†
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2480	4258	6660	9436	4568	6849	9715	4520	7168	10813
9	12	3177	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
	24	1923	3608	5894	8649	4117	6727	9715	4319	7168	10813
10	12	2817	4603	6979	9436	4634	6849	9715	4520	7168	10813
	16	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
	24	1337	2906	5050	7631	3614	6117	9320	3900	6879	10813
11	12	2427	4133	6436	9208	4541	6849	9715	4520	7168	10813
	16	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
	24	747*	2182	4160	6538	3067	5445	8478	3439	6276	10175
12	12	2020	3629	5807	8420	4198	6767	9715	4410	7168	10813
	16	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
	24	175*	1464*	3259	5415	2489	4723	7562	2942	5618	9287
14	12	1205*	2585	4463	6698	3427	5782	8768	3773	6620	10495
	16	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
	24		132†	1551*	3253*	1298*	3203	5603	1879	4185	7328
16	12	461†	1599*	3159*	4997	2594	4682	7298	3054	5613	9055
	16		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
	24				1377†	155†	1709*	3652*	795*	2699	5279
18	12		744†	2011*	3494*	1765*	3564	5786	2297	4533	7495
	16			848†	2132†	796†	2378*	4335*	1378*	3344	5958
	24						354†	1873*		1279*	3320*
20	12			1054†	2242†	997†	2513*	4363*	1552*	3460*	5948
	16				894†		1275†	2862*	556†	2180*	4318*
	24							339†			1565†

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 34.

SJ (3 5/8", 4")

Table 22

35 psf

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1630	2713	4068	5319	1741	3037	4873	7066
	16	1031*	2065	3358	4577	1238	2444	4161	6214
	24		931*	2108	3256	338*	1381*	2885	4694
9	12	1067*	2052	3288	4469	1271	2440	4090	6053
	16	424†	1341*	2496	3623	704*	1762	3271	5071
	24		125†	1137*	2161*		581*	1847*	3372
10	12	559†	1431*	2529*	3610	816*	1843*	3293	5006
	16		686†	1692*	2702*	206†	1111*	2406*	3947
	24			279†	1164†			896*	2150*
11	12	119†	876†	1835*	2800*	396†	1283*	2534*	4004
	16		118†	980†	1866*		518†	1612*	2910*
	24				296†				1072†
12	12		396†	1225†	2074*		776†	1845*	3096*
	16			368†	1134†			911†	1995†
	24								148†
14	12			254†	897†			715†	1611†
	16								529†
	24								
16	12								518†
	16								
	24								
18	12								
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3322	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2923	4754	6979	9436	4634	6849	9715	4520	7168	10813
	24	2157	3895	6249	9087	4308	6849	9715	4473	7168	10813
9	12	2958	4779	6979	9436	4634	6849	9715	4520	7168	10813
	16	2463	4220	6595	9436	4559	6849	9715	4520	7168	10813
	24	1533	3164	5386	8062	3791	6345	9617	4044	7076	10813
10	12	2554	4303	6663	9436	4634	6849	9715	4520	7168	10813
	16	1967	3631	5888	8607	4153	6753	9715	4356	7168	10813
	24	888	2388	4451	6932	3219	5652	8760	3564	6456	10438
11	12	2123	3781	6026	8727	4285	6849	9715	4475	7168	10813
	16	1454	3005	5121	7665	3705	6203	9396	3985	6967	10813
	24	251*	1602	3482	5742	2605	4895	7813	3039	5770	9526
12	12	1679	3231	5338	7867	3897	6408	9614	4156	7164	10813
	16	942*	2365	4321	6666	3222	5600	8629	3579	6428	10333
	24		836*	2520	4544	1963	4093	6797	2480	5030	8530
14	12	814*	2121*	3911	6043	3041	5314	8191	3437	6186	9927
	16		1135*	2740*	4657	2193	4286	6929	2687	5221	8669
	24			737†	2293*	669*	2441	4674	1303	3448	6379
16	12		1102†	2567*	4298*	2139	4126	6613	2642	5079	8356
	16			1328†	2839*	1162*	2934	5149	1742	3916	6845
	24				385†		862*	2621*	131*	1850*	4192
18	12		234†	1409†	2788*	1266*	2952*	5036	1826*	3922	6703
	16			152†	1317†	207†	1661*	3461*	812*	2616*	5025
	24						790†			358†	2152*
20	12			454†	1544†	471†	1873*	3586*	1039*	2799*	5105
	16						532†	1963†		1407*	3339*
	24										358†

Allowable axial loads based on SJ members with 40 ksi yield strength (F_y). Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 34.

Table 23

40 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1365*	2427	3755	4993	1520	2777	4561	6692
	16	716*	1722	2981	4180	968*	2126	3778	5758
	24		494*	1623*	2741		963*	2384	4098
9	12	781*	1737*	2937	4094	1021*	2141	3728	5618
	16		970*	2082*	3178	404*	1405*	2839	4555
	24			619†	1602*		126†	1300*	2721*
10	12	262†	1099*	2156*	3206	545†	1518*	2899	4535
	16		301†	1259*	2232*		728*	1945*	3397*
	24				582†			322†	1469*
11	12		538†	1454†	2384*	113†	942†	2123*	3516*
	16			540†	1384†		122†	1136†	2346*
	24								380†
12	12			842†	1654†		429†	1429†	2604*
	16				649†			429†	1427†
	24								
14	12				483†			300†	1129†
	16								
	24								
16	12								
	16								
	24								
18	12								
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2700	4505	6939	9436	4634	6849	9715	4520	7168	10813
	24	1840	3539	5845	8623	4051	6663	9715	4257	7168	10813
9	12	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
	16	2190	3911	6241	9050	4337	6849	9715	4504	7168	10813
	24	1155	2732	4891	7489	3470	5968	9166	3771	6735	10813
10	12	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
	16	1647	3263	5463	8112	3882	6433	9700	4127	7165	10813
	24	457*	1890	3873	6258	2832	5195	8210	3232	6039	9905
11	12	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
	16	1093	2586	4632	7091	3383	5820	8932	3710	6619	10615
	24		1049*	2835	4983	2155	4360	7165	2647	5275	8890
12	12	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
	16	550*	1905	3778	6026	2851	5156	8089	3258	6019	9804
	24		241*	1820*	3720	1455	3485	6058	2029	4458	7795
14	12	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
	16		619*	2129*	3935*	1737	3734	6252	2277	4695	7987
	24				1394*		1717*	3792	748*	2740	5471
16	12		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
	16			688†	2085*	646*	2306*	4381	1259*	3294	6044
	24							1652*		1045*	3165*
18	12			848†	2132†	796†	2378*	4335*	1378*	3344	5958
	16				559†		989†	2643*	277†	1930*	4149*
	24										1058*
20	12				894†		1275†	2862*	556†	2180*	4318*
	16							1126†		683†	2425*
	24										

Allowable axial loads based on SJ members with 40 ksi yield strength (F_y). Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 34.

Studs used in curtain wall systems provide support for the exterior and interior wall materials and resist wind (lateral) loads. The tables in this section provide information on limiting heights and sizing

recommendations for lateral loaded studs only and do not apply to axial load bearing studs. See pages 18 - 25 for axial load bearing information.

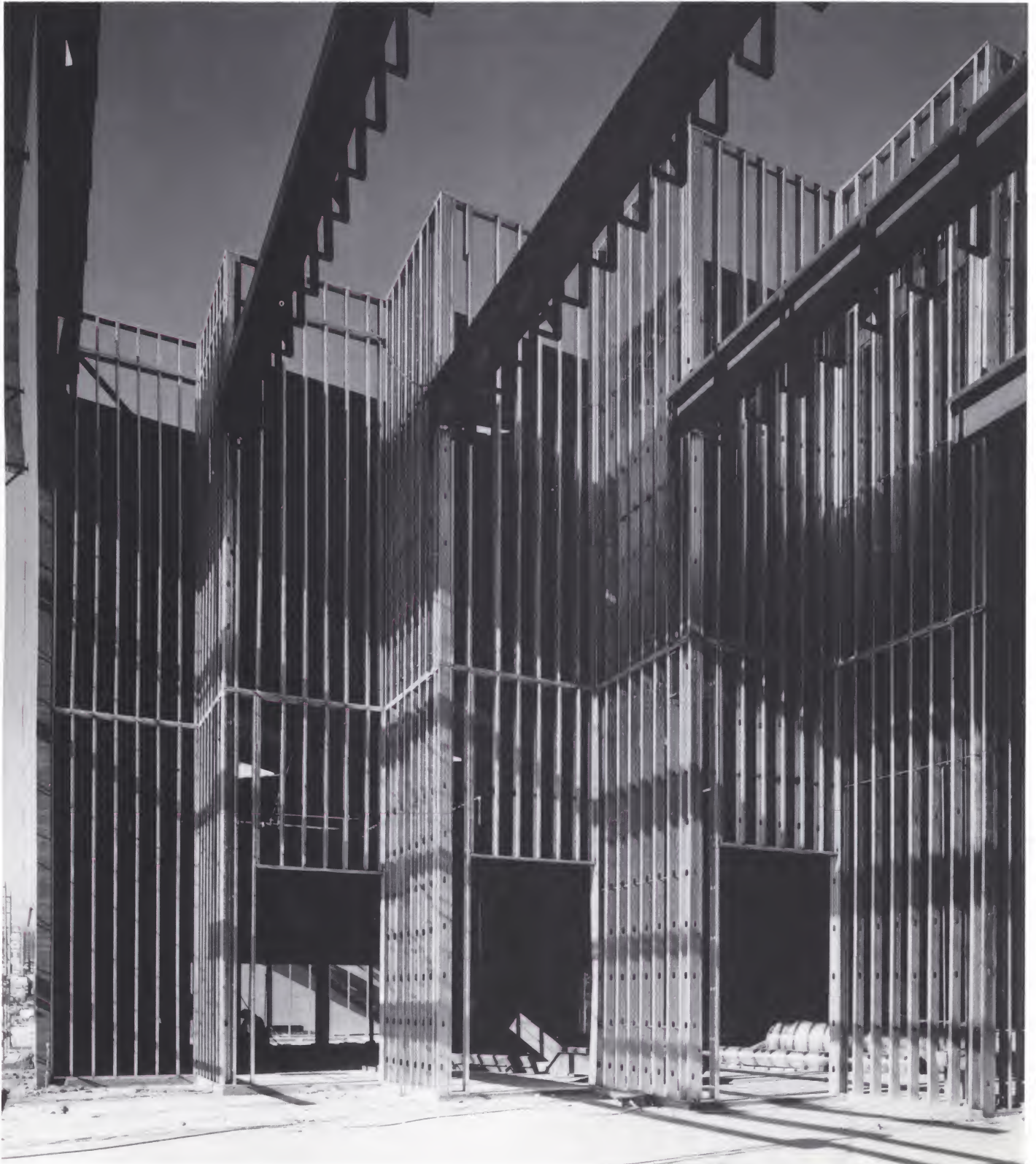


Table 24

ST20 Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Stud spacing (in o.c.)	L/240				L/360				L/600			
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 psf	12	9'1"	12'2"	13'2"	18'2"	8'0"	10'7"	11'6"	15'10"	6'8"	9'0"	9'8"	13'4"
	16	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	24	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'1"	7'8"	10'8"
20 psf	12	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	16	7'6"	10'1"	10'10"	15'0"	6'7"	8'9"	9'6"	13'1"	5'7"	7'4"	8'0"	11'1"
	24	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
25 psf	12	7'8"	10'3"	11'1"	15'4"	6'8"	9'0"	9'8"	13'4"	5'8"	7'7"	8'2"	11'3"
	16	7'0"	9'3"	10'1"	14'0"	6'1"	8'2"	8'9"	12'2"	5'2"	6'10"	7'4"	10'3"
	24	6'1"	8'2"	8'9"	12'2"	5'3"	7'1"	7'8"	10'8"	4'6"	6'0"	6'6"	9'0"
30 psf	12	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'2"	7'8"	10'8"
	16	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	24	5'9"	7'8"	8'3"	11'6"	5'0"	6'8"	7'2"	10'0"	4'2"	5'8"	6'1"	8'6"
35 psf	12	6'10"	9'2"	9'10"	13'8"	6'0"	8'0"	8'8"	12'0"	5'1"	6'9"	7'3"	10'1"
	16	6'3"	8'3"	9'0"	12'6"	5'6"	7'3"	7'10"	10'10"	4'7"	6'2"	6'7"	9'2"
	24	5'6"	7'3"	7'10"	10'10"	4'9"	6'4"	6'10"	9'6"	4'0"	5'4"	5'9"	8'0"
40 psf	12	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	16	6'0"	8'0"	8'7"	11'10"	5'2"	7'0"	7'6"	10'4"	4'4"	5'10"	6'4"	8'9"
	24	5'2"	7'0"	7'6"	10'4"	4'7"	6'1"	6'7"	9'1"	3'10"	5'1"	6'7"	7'8"

Limiting heights are for ST20 members with 33 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of studs alone increased 33% for wind loading. See Design Considerations, page 34.

Table 25

ST20 Studs: Curtain Wall Limiting Heights

Sheathing Both Sides

Wind load	Stud spacing (in o.c.)	Deflection criteria											
		L/240				L/360				L/600			
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 psf	12	12'2"	16'1"	17'4"	23'9"	9'8"	12'9"	13'9"	18'10"	8'6"	11'2"	12'0"	16'6"
	16	11'0"	14'6"	15'6"	20'8"	9'0"	11'9"	12'8"	17'4"	7'9"	10'3"	11'1"	15'2"
	24	9'0"	11'9"	12'8"	16'10"	8'1"	10'7"	11'4"	15'6"	7'1"	9'2"	9'10"	13'6"
20 psf	12	11'0"	14'6"	15'6"	20'8"	8'9"	11'7"	12'6"	17'2"	7'8"	10'1"	10'10"	15'0"
	16	9'6"	12'6"	13'4"	17'10"	8'1"	10'8"	11'6"	15'9"	7'1"	9'4"	10'1"	13'9"
	24	7'9"	10'2"	11'0"	14'7"	7'4"	9'7"	10'3"	14'1"	6'4"	8'4"	9'0"	12'3"
25 psf	12	9'9"	12'10"	13'10"	18'6"	8'2"	10'9"	11'7"	15'10"	7'1"	9'4"	10'2"	13'10"
	16	8'6"	11'2"	12'0"	16'0"	7'7"	9'10"	10'8"	14'7"	6'7"	8'8"	9'4"	12'9"
	24	6'10"	9'1"	9'9"	13'1"	6'9"	8'10"	9'7"	13'1"	6'0"	7'9"	8'4"	11'4"
30 psf	12	9'0"	11'9"	12'8"	16'10"	7'8"	10'1"	10'10"	15'0"	6'8"	8'10"	9'7"	13'1"
	16	7'9"	10'2"	11'0"	14'7"	7'1"	9'4"	10'1"	13'9"	6'2"	8'2"	8'9"	12'0"
	24	6'3"	8'3"	9'0"	12'0"	6'3"	8'3"	9'0"	12'0"	5'7"	7'3"	7'10"	10'8"
35 psf	12	8'3"	10'10"	11'8"	15'7"	7'3"	9'7"	10'4"	14'2"	6'4"	8'4"	9'1"	12'4"
	16	7'2"	9'6"	10'2"	13'7"	6'4"	8'10"	9'7"	13'1"	5'10"	7'9"	8'4"	11'4"
	24	5'10"	7'8"	8'3"	11'1"	5'10"	7'8"	8'3"	11'1"	5'3"	7'0"	7'6"	10'2"
40 psf	12	7'9"	10'2"	11'0"	14'7"	7'0"	9'2"	9'10"	13'7"	6'1"	8'1"	8'8"	11'10"
	16	6'8"	8'9"	9'6"	12'8"	6'6"	8'6"	9'2"	12'6"	5'8"	7'4"	8'0"	10'10"
	24	5'6"	7'2"	7'9"	10'4"	5'6"	7'2"	7'9"	10'4"	5'1"	6'8"	7'2"	9'9"

Limiting heights are for ST20 members with 33 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of studs alone increased 33% for wind loading. Deflection based on composite wall assembly (gypsum sheathing and any dry exterior finish and drywall or plaster interior) without addition of the exterior finish stiffness. See Design Considerations, page 34.

Table 26a

SJ Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Deflection limitation	Stud spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	13'4"	14'7"	15'9"	16'10"	14'4"	15'8"	16'11"	18'2"
		16	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"
		24	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
	L/360	12	11'8"	12'9"	13'9"	14'9"	12'6"	13'8"	14'10"	15'10"
		16	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		24	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"
20 psf	L/240	12	9'10"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
	L/360	12	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"
		16	11'0"	12'0"	13'0"	13'11"	11'10"	12'11"	14'0"	15'0"
		24	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
25 psf	L/240	12	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
	L/360	12	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		16	8'1"	8'10"	9'7"	10'3"	8'9"	9'6"	10'4"	11'0"
		24	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
30 psf	L/240	12	11'1"	12'3"	13'3"	14'2"	12'1"	13'3"	14'4"	15'4"
		16	10'2"	11'2"	12'1"	12'11"	11'0"	12'0"	13'0"	13'11"
		24	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
	L/360	12	9'10"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
35 psf	L/240	12	8'3"	9'1"	9'9"	10'6"	8'11"	9'9"	10'6"	11'3"
		16	7'6"	8'3"	8'11"	9'6"	8'9"	9'6"	10'3"	10'3"
		24	6'7"	7'2"	7'9"	8'4"	7'1"	7'9"	8'4"	8'11"
	L/360	12	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
40 psf	L/240	12	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"
		16	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
		24	7'4"	8'0"	8'8"	9'3"	7'11"	8'8"	9'4"	10'0"
	L/360	12	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
		16	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
		24	6'2"	6'9"	7'4"	7'10"	6'8"	7'3"	7'10"	8'5"
45 psf	L/240	12	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"
		16	9'1"	10'0"	10'9"	11'6"	9'10"	10'9"	11'7"	12'5"
		24	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"
	L/360	12	8'9"	9'7"	10'4"	11'1"	9'5"	10'4"	11'2"	11'11"
		16	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"
		24	7'0"	7'7"	8'3"	8'10"	7'6"	8'2"	8'10"	9'6"
50 psf	L/240	12	7'5"	8'1"	8'9"	9'4"	8'0"	8'9"	9'5"	10'1"
		16	6'9"	7'4"	7'11"	8'6"	7'3"	7'11"	8'7"	9'2"
		24	5'10"	6'5"	6'11"	7'5"	6'4"	6'11"	7'6"	8'0"
	L/360	12	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		16	8'9"	9'7"	10'4"	11'0"	9'5"	10'3"	11'1"	11'11"
		24	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"
60 psf	L/240	12	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
		16	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"
		24	6'8"	7'3"	7'10"	8'5"	7'2"	7'10"	8'6"	9'1"
	L/360	12	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
		16	6'5"	7'0"	7'7"	8'2"	6'11"	7'7"	8'2"	8'9"
		24	5'7"	6'2"	6'8"	7'1"	6'1"	6'7"	7'2"	7'8"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side based on the properties of the studs alone with a 33% increase for wind loading. See Design Considerations, page 34.

SJ (3 5/8", 4")



Table 26b

SJ Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Deflection limitation	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	19'10"	21'9"	23'7"	25'3"	25'4"	27'6"	29'6"	27'6"	29'10"	32'0"
		16	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	26'9"	25'0"	27'1"	29'1"
		24	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
	L/360	12	17'4"	19'0"	20'7"	22'1"	22'2"	24'0"	25'9"	24'0"	26'0"	27'11"
		16	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		24	13'9"	15'1"	16'4"	17'6"	17'7"	19'1"	20'5"	19'1"	20'8"	22'2"
	L/600	12	14'7"	16'0"	17'4"	18'7"	18'8"	20'3"	21'9"	20'3"	22'0"	23'7"
		16	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		24	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
20 psf	L/240	12	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	26'9"	25'0"	27'1"	29'1"
		16	16'5"	17'11"	19'5"	20'10"	20'11"	22'8"	24'4"	22'8"	24'7"	26'5"
		24	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
	L/360	12	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		16	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		24	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
	L/600	12	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		16	12'1"	13'3"	14'4"	15'4"	15'5"	16'9"	17'11"	16'9"	18'2"	19'5"
		24	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
25 psf	L/240	12	16'9"	18'4"	19'10"	21'3"	21'3"	23'2"	24'10"	23'2"	25'2"	27'0"
		16	15'2"	16'8"	18'1"	19'4"	19'5"	21'1"	22'7"	21'1"	22'10"	24'6"
		24	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
	L/360	12	14'7"	16'0"	17'4"	18'7"	18'7"	20'3"	21'9"	20'3"	22'0"	23'7"
		16	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		24	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
	L/600	12	12'4"	13'6"	14'8"	15'8"	15'8"	17'1"	18'4"	17'1"	18'6"	19'10"
		16	11'2"	12'3"	13'4"	14'3"	14'4"	15'6"	16'8"	15'6"	16'10"	18'1"
		24	9'9"	10'9"	11'7"	12'5"	12'6"	13'7"	14'6"	13'7"	14'8"	15'9"
30 psf	L/240	12	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		16	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		24	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
	L/360	12	13'9"	15'1"	16'4"	17'6"	17'7"	19'1"	20'5"	19'1"	20'8"	22'2"
		16	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
		24	10'11"	12'0"	13'0"	13'11"	13'11"	15'2"	16'3"	15'2"	16'5"	17'7"
	L/600	12	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
		16	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
		24	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	12'9"	13'10"	14'10"
35 psf	L/240	12	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	20'9"	22'6"	24'1"
		16	13'7"	14'11"	16'2"	17'3"	17'4"	18'10"	20'2"	18'10"	20'5"	21'11"
		24	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	16'5"	17'10"	19'2"
	L/360	12	13'1"	14'4"	15'6"	16'7"	16'8"	18'1"	19'5"	18'1"	19'8"	21'1"
		16	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	16'5"	17'10"	19'2"
		24	10'4"	11'4"	12'4"	13'2"	13'3"	14'4"	15'5"	14'4"	15'7"	16'9"
	L/600	12	11'0"	12'1"	13'1"	14'0"	14'1"	15'3"	16'4"	15'3"	16'7"	17'9"
		16	10'0"	11'0"	11'11"	12'9"	12'10"	13'10"	14'11"	13'11"	15'1"	16'2"
		24	8'9"	9'7"	10'5"	11'2"	11'2"	12'1"	13'0"	12'1"	13'2"	14'1"
40 psf	L/240	12	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		16	13'0"	14'3"	15'5"	16'6"	16'7"	18'0"	19'4"	18'0"	19'6"	20'11"
		24	11'4"	12'5"	13'6"	14'5"	14'6"	15'9"	16'10"	15'9"	17'1"	18'4"
	L/360	12	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
		16	11'4"	12'5"	13'6"	14'5"	14'6"	15'9"	16'10"	15'9"	17'1"	18'4"
		24	9'11"	10'10"	11'9"	12'7"	12'8"	13'9"	14'9"	13'9"	14'11"	16'0"
	L/600	12	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
		16	9'7"	10'6"	11'4"	12'2"	12'3"	13'3"	14'2"	13'3"	14'5"	15'5"
		24	8'4"	9'2"	9'11"	10'8"	10'8"	11'7"	12'5"	11'7"	12'7"	13'6"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side based on the properties of the studs alone with a 33% increase for wind loading. See Design Considerations, page 34.

SJ (6", 7 1/4", 8")



Table 27

SJ Studs: Curtain Wall Limiting Heights

Sheathing Both Sides

Wind load	Deflection limitation	Stud spacing (in o.c.)	362 SJ (3¾")				40 SJ (4")					
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge		
15 psf	L/240	12	14'2"	15'3"	16'4"	17'5"	15'2"	16'5"	17'7"	18'8"		
		16	13'1"	14'1"	15'0"	15'11"	14'0"	15'1"	16'2"	17'2"		
		24	11'5"	12'4"	13'2"	13'11"	12'3"	13'2"	14'1"	15'0"		
	L/360	12	12'4"	13'4"	14'3"	15'2"	13'3"	14'4"	15'4"	16'4"		
		16	11'5"	12'4"	13'2"	13'11"	12'3"	13'2"	14'1"	15'0"		
		24	10'0"	10'9"	11'6"	12'2"	10'9"	11'6"	12'4"	13'1"		
20 psf	L/240	12	12'10"	13'11"	14'10"	15'10"	13'9"	14'11"	16'0"	17'0"		
		16	11'11"	12'10"	13'8"	14'6"	12'9"	13'9"	14'8"	15'7"		
		24	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"		
	L/360	12	11'3"	12'2"	13'0"	13'10"	12'1"	13'0"	13'11"	14'10"		
		16	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"		
		24	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"		
25 psf	L/240	12	11'11"	12'11"	13'10"	14'8"	12'10"	13'10"	14'10"	15'9"		
		16	11'1"	11'11"	12'8"	13'5"	11'10"	12'9"	13'7"	14'5"		
		24	9'8"	10'5"	11'1"	11'9"	10'4"	11'2"	11'11"	12'8"		
	L/360	12	10'5"	11'3"	12'1"	12'10"	11'2"	12'1"	12'11"	13'9"		
		16	9'8"	10'5"	11'1"	11'9"	10'4"	11'2"	11'11"	12'8"		
		24	8'5"	9'1"	9'8"	10'3"	9'0"	9'9"	10'5"	11'0"		
30 psf	L/240	12	11'3"	12'2"	13'0"	13'10"	12'1"	13'0"	13'11"	14'10"		
		16	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"		
		24	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"		
	L/360	12	9'10"	10'7"	11'4"	12'1"	10'6"	11'4"	12'2"	13'0"		
		16	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"		
		24	7'11"	8'6"	9'1"	9'8"	8'6"	9'2"	9'9"	10'5"		
35 psf	L/240	12	10'8"	11'6"	12'4"	13'1"	11'5"	12'4"	13'3"	14'1"		
		16	9'10"	10'7"	11'4"	12'0"	10'7"	11'5"	12'2"	12'11"		
		24	8'7"	9'3"	9'11"	10'6"	9'3"	9'11"	10'8"	11'3"		
	L/360	12	9'4"	10'1"	10'9"	11'5"	10'0"	10'10"	11'7"	12'4"		
		16	8'7"	9'3"	9'11"	10'6"	9'3"	9'11"	10'8"	11'3"		
		24	7'6"	8'1"	8'8"	9'2"	8'1"	8'8"	9'4"	9'10"		
40 psf	L/240	12	10'2"	11'0"	11'10"	12'6"	10'11"	11'10"	12'8"	13'6"		
		16	9'5"	10'2"	10'10"	11'6"	10'11"	10'11"	11'8"	12'4"		
		24	8'3"	8'10"	9'6"	10'1"	8'10"	9'6"	10'2"	10'10"		
	L/360	12	8'11"	9'8"	10'4"	10'11"	9'7"	10'4"	11'1"	11'9"		
		16	8'3"	8'10"	9'6"	10'1"	8'10"	9'6"	10'2"	10'10"		
		24	7'2"	7'9"	8'3"	8'9"	7'9"	8'4"	8'11"	9'5"		
Wind load	Deflection limitation	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7¼")			80 SJ (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	20'9"	22'6"	24'3"	25'10"	26'2"	28'2"	30'1"	28'4"	30'7"	32'7"
		16	19'2"	20'9"	22'3"	23'8"	24'1"	25'10"	27'6"	26'0"	28'0"	29'10"
		24	16'9"	18'1"	19'5"	20'8"	21'0"	22'7"	24'0"	22'9"	24'5"	26'1"
	L/360	12	18'2"	19'8"	21'2"	22'7"	22'11"	24'8"	26'3"	24'9"	26'8"	28'6"
		16	16'9"	18'1"	19'5"	20'8"	21'0"	22'7"	24'0"	22'9"	24'5"	26'1"
		24	14'7"	15'10"	17'0"	18'1"	18'4"	19'9"	21'0"	19'10"	21'4"	22'9"
20 psf	L/240	12	18'11"	20'6"	22'0"	23'6"	23'10"	25'8"	27'4"	25'9"	27'9"	29'7"
		16	17'5"	18'10"	20'2"	21'6"	21'10"	23'6"	25'0"	23'8"	25'5"	27'1"
		24	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"
	L/360	12	16'6"	17'11"	19'3"	20'6"	20'10"	22'5"	23'10"	22'6"	24'3"	25'11"
		16	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"
		24	13'3"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	18'1"	19'5"	20'8"
25 psf	L/240	12	17'6"	19'0"	20'5"	21'9"	22'1"	23'9"	25'4"	23'11"	25'9"	27'6"
		16	16'2"	17'6"	18'9"	19'11"	20'3"	21'10"	23'2"	21'10"	23'7"	25'2"
		24	12'10"	15'3"	16'5"	17'5"	17'9"	19'0"	20'3"	19'2"	20'7"	22'0"
	L/360	12	15'4"	16'7"	17'10"	19'0"	19'4"	20'9"	22'2"	20'11"	22'6"	24'0"
		16	14'1"	15'3"	16'5"	17'5"	17'9"	19'0"	20'3"	19'2"	20'7"	22'0"
		24	12'4"	13'4"	14'4"	15'3"	15'6"	16'8"	17'8"	16'9"	18'0"	19'2"
30 psf	L/240	12	16'6"	17'11"	19'3"	20'6"	20'10"	22'5"	23'10"	22'6"	24'3"	25'11"
		16	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"
		24	10'8"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	16'9"	19'5"	20'8"
	L/360	12	14'5"	15'8"	16'10"	17'11"	18'2"	19'7"	20'10"	19'8"	21'2"	22'7"
		16	13'3"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	18'1"	19'5"	20'8"
		24	10'8"	12'7"	13'6"	14'4"	14'7"	15'8"	16'8"	15'9"	16'11"	18'1"
35 psf	L/240	12	15'8"	17'0"	18'3"	19'6"	19'9"	21'3"	22'8"	21'5"	23'0"	24'7"
		16	13'9"	15'7"	16'9"	17'10"	18'2"	19'6"	20'9"	19'7"	21'1"	22'6"
		24	9'2"	13'8"	14'8"	15'7"	15'10"	17'0"	18'1"	14'4"	18'5"	19'8"
	L/360	12	13'8"	14'10"	16'0"	17'0"	17'3"	18'7"	19'10"	18'8"	20'1"	21'6"
		16	12'7"	13'8"	14'8"	15'7"	15'10"	17'0"	18'1"	17'2"	18'5"	19'8"
		24	9'2"	11'11"	12'9"	13'7"	13'10"	14'10"	15'10"	14'4"	16'1"	17'2"
40 psf	L/240	12	15'0"	16'3"	17'6"	18'8"	18'11"	20'4"	21'8"	20'5"	22'0"	23'6"
		16	12'0"	14'11"	16'0"	17'1"	17'4"	18'8"	19'10"	18'9"	20'2"	21'6"
		24	8'0"	12'10"	14'0"	14'11"	14'3"	16'3"	17'4"	12'7"	17'7"	18'9"
	L/360	12	13'1"	14'2"	15'3"	16'3"	16'6"	17'9"	18'11"	17'0"	19'3"	20'6"
		16	12'0"	13'1"	14'0"	14'11"	15'2"	16'3"	17'4"	16'5"	17'7"	18'9"
		24	8'0"	11'5"	12'3"	13'0"	13'3"	14'3"	15'2"	12'7"	15'5"	16'5"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of the studs alone with a 33% increase for wind loading. Deflection based on composite wall assembly (gypsum sheathing and dry exterior finish and drywall or plaster interior) without addition of the exterior finish stiffness. See Design Considerations, page 34.

Table 28

SJ Studs: Curtain Wall Limiting Heights

Stucco Exterior

Wind load	Stud spacing (in o.c.)	362 SJ (3¾")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
15 psf	12	14'5"	15'3"	16'0"	16'9"	15'4"	16'2"	17'1"	17'11"
	16	13'8"	14'4"	15'0"	15'8"	14'6"	15'3"	16'0"	16'9"
	24	11'11"	12'6"	13'2"	13'9"	12'8"	13'4"	14'0"	14'7"
20 psf	12	13'1"	13'10"	14'6"	15'3"	13'11"	14'9"	15'6"	16'3"
	16	12'5"	13'0"	13'8"	14'3"	13'2"	13'10"	14'7"	15'2"
	24	10'10"	11'5"	11'11"	12'6"	11'6"	12'1"	12'8"	13'3"
25 psf	12	12'2"	12'10"	13'6"	14'2"	12'11"	13'8"	14'5"	15'1"
	16	11'6"	12'1"	12'8"	13'3"	12'3"	12'10"	13'6"	14'1"
	24	10'1"	10'7"	11'1"	11'7"	10'8"	11'3"	11'10"	12'4"
30 psf	12	11'5"	12'1"	12'8"	13'4"	12'2"	12'0"	13'6"	14'2"
	16	10'10"	11'5"	11'11"	12'6"	11'6"	12'1"	12'8"	13'3"
	24	9'6"	9'11"	10'5"	10'11"	10'1"	10'7"	11'1"	11'7"
35 psf	12	10'10"	11'6"	12'1"	12'8"	11'7"	12'2"	12'10"	13'6"
	16	10'4"	10'10"	11'4"	11'10"	10'11"	11'6"	12'1"	12'7"
	24	9'0"	9'5"	9'11"	10'4"	9'7"	10'1"	10'7"	11'0"
40 psf	12	10'5"	11'0"	11'6"	12'1"	11'1"	11'8"	12'4"	12'11"
	16	9'10"	10'4"	10'10"	11'4"	10'5"	11'0"	11'7"	12'1"
	24	8'7"	9'0"	9'6"	9'11"	9'2"	9'7"	10'1"	10'7"

Wind load	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7¼")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	12	20'4"	21'7"	22'11"	24'1"	24'10"	26'5"	27'10"	26'9"	28'5"	30'1"
	16	19'1"	20'3"	21'4"	22'5"	23'3"	24'7"	25'10"	25'0"	26'5"	27'11"
	24	16'8"	17'8"	18'8"	19'7"	20'3"	21'6"	22'7"	21'10"	23'1"	24'4"
20 psf	12	18'5"	19'7"	20'10"	21'11"	22'7"	24'0"	25'3"	24'4"	25'10"	27'4"
	16	17'4"	18'5"	19'5"	20'5"	21'1"	22'4"	23'6"	22'8"	24'0"	25'4"
	24	15'2"	16'1"	16'11"	17'10"	18'5"	19'6"	20'6"	19'10"	21'0"	22'2"
25 psf	12	17'2"	18'3"	19'4"	20'4"	20'11"	22'3"	23'6"	22'7"	24'0"	25'4"
	16	16'1"	17'1"	18'0"	18'11"	19'7"	20'9"	21'10"	21'1"	22'4"	23'6"
	24	12'10"	14'11"	15'9"	16'6"	17'1"	18'1"	19'0"	18'5"	19'6"	20'6"
30 psf	12	16'1"	17'2"	18'2"	19'2"	19'9"	20'11"	22'1"	21'3"	22'7"	23'10"
	16	15'2"	16'1"	16'11"	17'10"	18'5"	19'6"	20'6"	19'10"	21'0"	22'2"
	24	10'8"	14'0"	14'10"	15'7"	16'1"	17'0"	17'11"	16'9"	18'4"	19'4"
35 psf	12	15'4"	16'3"	17'3"	18'2"	18'9"	19'11"	21'0"	20'2"	21'5"	22'8"
	16	13'9"	15'3"	16'1"	16'11"	17'6"	18'6"	19'6"	18'10"	19'11"	21'0"
	24	9'2"	13'4"	14'1"	14'9"	15'3"	16'2"	17'0"	14'4"	17'5"	18'4"
40 psf	12	14'8"	15'7"	16'6"	17'5"	17'11"	19'0"	20'1"	19'3"	20'6"	21'8"
	16	12'0"	14'7"	15'5"	16'2"	16'9"	17'9"	18'8"	18'0"	19'1"	20'1"
	24	8'0"	12'9"	13'5"	14'2"	14'3"	15'6"	16'3"	12'7"	16'8"	17'7"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of the studs alone with a 33% increase for wind loading. Deflection limitation of L/360 based on composite wall assembly (gypsum sheathing and stucco exterior and drywall or plaster interior). See Design Considerations, page 34.



SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 29

SJ Studs: Curtain Wall Limiting Heights

Brick Exterior

Wind load	Stud spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")					
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge		
15 psf	12	12'5"	13'0"	13'8"	14'3"	13'0"	13'8"	14'4"	15'0"		
	16	11'11"	12'5"	12'11"	13'5"	12'4"	12'11"	13'6"	14'1"		
	24	10'5"	10'10"	11'3"	11'9"	10'10"	11'4"	11'10"	12'4"		
20 psf	12	11'4"	11'10"	12'5"	12'11"	11'10"	12'5"	13'1"	13'8"		
	16	10'10"	11'3"	11'9"	12'2"	11'3"	11'9"	12'3"	12'10"		
	24	9'5"	9'10"	10'3"	10'8"	9'10"	10'3"	10'9"	11'2"		
25 psf	12	10'6"	11'0"	11'6"	12'0"	10'11"	11'6"	12'1"	12'8"		
	16	10'0"	10'6"	10'11"	11'4"	10'5"	10'11"	11'5"	11'11"		
	24	8'9"	9'2"	9'6"	9'11"	9'1"	9'6"	10'0"	10'5"		
30 psf	12	9'10"	10'4"	10'10"	11'4"	10'4"	10'10"	11'5"	11'11"		
	16	9'5"	9'10"	10'3"	10'8"	9'10"	10'3"	10'9"	11'2"		
	24	8'3"	8'7"	8'11"	9'4"	8'7"	9'0"	9'5"	9'9"		
35 psf	12	9'5"	9'10"	10'3"	10'9"	9'9"	10'4"	10'10"	11'4"		
	16	9'0"	9'4"	9'9"	10'1"	9'4"	9'9"	10'2"	10'8"		
	24	7'10"	8'2"	8'6"	8'10"	8'2"	8'6"	8'11"	9'3"		
45 psf	12	9'0"	9'5"	9'10"	10'3"	9'4"	9'10"	10'4"	10'10"		
	16	8'7"	8'11"	9'4"	9'8"	8'11"	9'4"	9'9"	10'2"		
	24	7'6"	7'10"	8'2"	8'5"	7'10"	8'2"	8'6"	8'11"		
Wind load	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	12	16'4"	17'6"	18'8"	19'9"	20'0"	21'5"	22'8"	21'6"	23'0"	24'6"
	16	15'4"	16'4"	17'4"	18'3"	18'6"	19'9"	20'11"	19'10"	21'3"	22'6"
	24	13'5"	14'3"	15'1"	15'11"	16'2"	17'3"	18'3"	17'4"	18'6"	19'8"
20 psf	12	14'10"	15'11"	16'11"	17'11"	18'2"	19'5"	20'7"	19'6"	20'11"	22'3"
	16	13'11"	14'10"	15'9"	16'7"	16'10"	17'11"	19'0"	18'1"	19'3"	20'5"
	24	12'2"	12'11"	13'9"	14'6"	14'8"	15'8"	16'7"	15'9"	16'10"	17'10"
25 psf	12	13'10"	14'9"	15'9"	16'8"	16'10"	18'0"	19'1"	18'1"	19'5"	20'8"
	16	12'11"	13'9"	14'7"	15'5"	15'7"	16'8"	17'7"	16'9"	17'11"	19'0"
	24	11'4"	12'0"	12'9"	13'5"	13'8"	14'7"	15'5"	14'8"	15'8"	16'7"
30 psf	12	13'0"	13'11"	14'10"	15'8"	15'10"	17'0"	18'0"	17'1"	18'3"	19'5"
	16	12'2"	12'11"	13'9"	14'6"	14'8"	15'8"	16'7"	15'9"	16'10"	17'10"
	24	10'8"	11'4"	12'0"	12'8"	12'10"	13'8"	14'6"	13'9"	14'8"	15'7"
35 psf	12	12'4"	13'2"	14'1"	14'11"	15'1"	16'1"	17'1"	16'2"	17'4"	18'5"
	16	11'7"	12'4"	13'1"	13'9"	14'0"	14'11"	15'9"	15'0"	16'0"	17'0"
	24	9'2"	10'9"	11'5"	12'0"	12'2"	13'0"	13'9"	13'1"	14'0"	14'10"
45 psf	12	11'10"	12'8"	13'5"	14'3"	14'5"	15'5"	16'4"	15'6"	16'7"	17'8"
	16	11'1"	11'9"	12'6"	13'2"	13'4"	14'3"	15'1"	14'4"	15'4"	16'3"
	24	8'0"	10'3"	10'11"	11'6"	11'8"	12'5"	13'2"	12'6"	13'4"	14'2"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of the stud alone with a 33% increase for wind loading; Deflection limitations of L/600 based on composite wall assembly (gypsum sheathing and brick veneer exterior and drywall or plaster interior) with noncomposite addition of brick veneer stiffness. See Design Considerations, page 34.

SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Interior partitions are designed to withstand a 5 psf lateral load but are not designed to carry axial loads. ST studs are typically used for interior non-load bearing partitions but SJ members may be used when the heights exceed those allowed with ST drywall studs.

Table 30**Interior Framing: Limiting Heights**

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furred wall, one layer
25 gauge (.0179" min.)					
158ST25	16"	L/120	10'9"f	10'9"d	10'3'd
		L/240	9'6"d	10'6"d	8'3'd
		L/360	8'3'd	9'0"d	7'3'd
212ST25	16"	L/120	8'9"f	8'9"f	8'9"f
		L/240	8'3"d	8'9"f	7'3'd
		L/360	7'3'd	8'0"d	6'3'd
358ST25	16"	L/120	13'9"f	13'9"f	13'9"d
		L/240	12'6"d	13'6"d	11'0'd
		L/360	10'9'd	11'9"d	9'9'd
400ST25	16"	L/120	11'3"f	11'3"f	11'3"f
		L/240	10'9"d	11'3"f	9'9'd
		L/360	9'6'd	10'3'd	8'6'd
600ST25	16"	L/120	16'9"f	16'9"f	16'9"f
		L/240	16'0"d	16'9"f	14'6'd
		L/360	14'0'd	14'9"f	12'9'd
212ST22	16"	L/120	13'6"f	13'6"f	13'6"f
		L/240	13'6"f	13'6"f	12'9'd
		L/360	12'3'd	13'0'd	11'0'd
358ST22	16"	L/120	17'3"f	17'3"f	17'3"f
		L/240	17'3"d	17'3"f	15'9'd
		L/360	15'0'd	15'9'd	13'9'd
400ST22	16"	L/120	14'3"f	14'3"f	14'3"f
		L/240	14'3"f	14'3"f	13'9'd
		L/360	13'0'd	13'9'd	12'0'd
600ST22	16"	L/120	20'0"f	20'0"f	20'0"f
		L/240	20'0"f	20'0"f	20'0"f
		L/360	20'0"f	20'0"f	18'9"f
212ST25	16"	L/120	15'0"v	15'0"v	15'0"v
		L/240	15'0"v	15'0"v	15'0"v
		L/360	15'0"v	15'0"v	15'0"v

22 gauge (.0270" min.)

158ST25	16"	L/120	10'9"f	10'9"d	10'3'd
		L/240	9'6"d	10'6"d	8'3'd
		L/360	8'3'd	9'0"d	7'3'd
212ST25	16"	L/120	8'9"f	8'9"f	8'9"f
		L/240	8'3"d	8'9"f	7'3'd
		L/360	7'3'd	8'0"d	6'3'd
358ST25	16"	L/120	13'9"f	13'9"f	13'9"d
		L/240	12'6"d	13'6"d	11'0'd
		L/360	10'9'd	11'9"d	9'9'd
400ST25	16"	L/120	11'3"f	11'3"f	11'3"f
		L/240	10'9"d	11'3"f	9'9'd
		L/360	9'6'd	10'3'd	8'6'd
600ST25	16"	L/120	16'9"f	16'9"f	16'9"f
		L/240	16'0"d	16'9"f	14'6'd
		L/360	14'0'd	14'9"f	12'9'd
212ST22	16"	L/120	13'6"f	13'6"f	13'6"f
		L/240	13'6"f	13'6"f	12'9'd
		L/360	12'3'd	13'0'd	11'0'd
358ST22	16"	L/120	17'3"f	17'3"f	17'3"f
		L/240	17'3"d	17'3"f	15'9'd
		L/360	15'0'd	15'9'd	13'9'd
400ST22	16"	L/120	14'3"f	14'3"f	14'3"f
		L/240	14'3"f	14'3"f	13'9'd
		L/360	13'0'd	13'9'd	12'0'd
600ST22	16"	L/120	20'0"f	20'0"f	20'0"f
		L/240	20'0"f	20'0"f	20'0"f
		L/360	20'0"f	20'0"f	18'9"f
212ST25	16"	L/120	15'0"v	15'0"v	15'0"v
		L/240	15'0"v	15'0"v	15'0"v
		L/360	15'0"v	15'0"v	15'0"v

Limiting heights for 1/2" or 5/8" thick gypsum panels and 5 psf uniform load perpendicular to partition or furring. Use one layer heights for unbalanced assemblies; use two layer heights for multi-layer assemblies. For furring, stud attached to top and bottom runners and free-standing up to 12 ft. height. *Studs exceeding 12 ft. height require mid-height anchor to exterior wall. Assemblies without face panels and chase wall partitions require vertical cross braces 4 ft. o.c. maximum. Limiting criteria: d - deflection, f - bending stress, v - end reaction shear. Consult local code authority for limiting criteria.

The following tables contain limiting heights for ST studs in interior partitions and chase walls. Limiting heights for 362SJ20 and 40SJ20 are also shown. Limiting heights for other SJ members and for tall walls are available from the Uni-mast Technical Departments.

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furred wall, one layer
20 gauge (.0312" min.)					
212ST20	16"	L/120	17'4"d	17'11"f	16'6"d*
		L/240	13'10"d	16'1"d	13'0"d*
		L/360	12'0"d	14'0"d	11'6"d*
	24"	L/120	14'7"f	14'7"f	14'6"d*
		L/240	12'0"d	13'5"f	11'6"d*
		L/360	10'6"d	12'4"d	10'0"d*
358ST20	16"	L/120	22'7"d	23'8"f	21'9"d*
		L/240	17'11"d	20'2"d	17'3"d*
		L/360	15'7"d	17'8"d	15'0"d*
	24"	L/120	19'4"f	19'4"f	19'0"d*
		L/240	15'7"d	17'8"d	15'0"d*
		L/360	13'8"d	15'6"d	13'3"d*
400ST20	16"	L/120	24'3"d	25'6"f	23'6"d*
		L/240	19'2"d	21'7"d	18'9"d*
		L/360	16'10"d	18'11"d	16'3"d*
	24"	L/120	20'9"f	20'9"f	20'6"d*
		L/240	16'10"d	18'11"d	16'3"d*
		L/360	14'8"d	16'6"d	14'3"d*
600ST20	16"	L/120	32'11"d	33'11"f	32'3"d*
		L/240	26'11"d	28'6"d	25'6"d*
		L/360	22'10"d	24'11"d	23'3"d*
	24"	L/120	25'3"f	25'3"f	28'0"d*
		L/240	22'10"d	24'11"d	22'3"d*
		L/360	19'11"d	21'10"d	19'6"d*
SJ style (.0341" min.)					
362SJ20	16"	L/120	24'0"d	25'0"d	23'0"d*
		L/240	19'0"d	19'9"d	18'3"d*
		L/360	16'9"d	17'3"d	16'0"d*
	24"	L/120	21'0"d	21'9"d	20'3"d*
		L/240	16'9"d	17'3"d	16'0"d*
		L/360	14'6"d	15'0"d	14'0"d*
40SJ20	16"	L/120	25'9"d	26'9"d	24'9"d*
		L/240	20'6"d	21'3"d	19'9"d*
		L/360	18'0"d	18'6"d	17'3"d*
	24"	L/120	22'6"d	23'3"d	21'6"d*
		L/240	18'0"d	18'6"d	17'3"d*
		L/360	15'9"d	16'3"d	15'0"d*

Table 31**Chase Wall: Limiting Heights**

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers
158ST25	16"	L/120	15'3"f	15'3"f
		L/240	13'3"d	14'6"d
		L/360	11'6"d	12'9"d
212ST25	16"	L/120	12'6"f	12'6"f
		L/240	11'6"d	12'6"f
		L/360	10'0"d	11'0'd
358ST25	16"	L/120	19'6"f	19'6"f
		L/240	17'6"d	19'0"d
		L/360	15'6"d	16'6"d
400ST25	16"	L/120	16'0"f	16'0"f
		L/240	15'6"d	16'0"f
		L/360	13'6"d	14'6"d
600ST25	16"	L/120	23'6"f	23'6"f
		L/240	22'9"d	23'6"f
		L/360	19'9"d	21'3"d
212ST20	16"	L/120	19'3"f	19'3"f
		L/240	19'3"f	19'3"f
		L/360	17'3"d	18'6"d

The following conditions have been considered in developing tabular data for studs:

1. Bending stress
2. Axial stress
3. Combined axial and bending stress
4. Shear Stress
5. Wind load deflection including effect of axial load
6. Web crippling at supports
7. Slenderness ratio not to exceed 300 for construction loads only (no lateral loads)
8. Slenderness ratio not to exceed 200 for laterally loaded studs and combined loaded studs (axial and lateral loads)

Calculations are based on the following factors:

1. AISI "Specifications for the Design of Cold-Formed Steel Structural Members", 1986 edition.

2. Yield strength: 40,000 psi (40 ksi) for SJ studs, 33,000 psi (33 ksi) for CR runners and ST studs (Contact the Technical Service Departments for information on 33 ksi and 50 ksi SJ studs.)
3. Lateral bracing provided by cold-rolled channels or horizontal straps spaced a maximum of 48 " o.c. for axially loaded studs and by gypsum board or sheathing each side for laterally loaded studs only.
4. Structural and physical properties of members shown in Tables 2-7.
5. Actual bending and axial stresses multiplied by .75 in accordance with AISI Section A4.4.
6. Web crippling based on test data for studs with minimum 10" unpunched steel at both ends of member; for 20 and 18 gauge studs having 20 and 18 gauge runner, respectively; and for 16 and 14 gauge using a minimum of 18 gauge runner. Web stiffening may be required when field cuts reduce this minimum 10" unpunched steel.

STUDS: Curtain Wall Slip Track

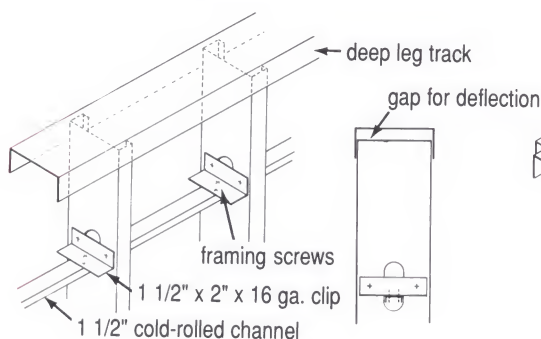
Curtain Wall Slip Tracks may be required to accommodate the deflection of floor beams or floor decks above curtain wall or interior partitions. Slip tracks can not be used in axial load bearing stud conditions or above continuous window spandrels.

Details for a single slip track and a double slip track, using custom deep leg tracks, are shown below. The single track detail requires 1 1/2" cold-rolled channel and 1 1/2" x 2" x 16 gauge clips installed

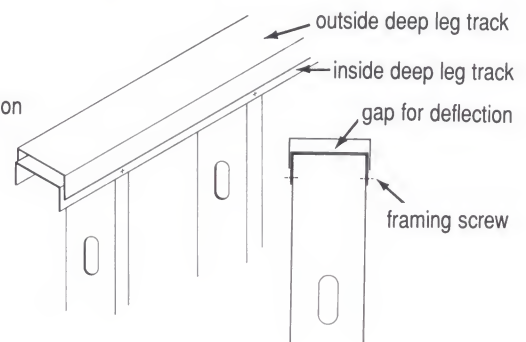
continuously through the upper most punchouts to align the studs vertically within the plane of the wall.

Slip track details must be designed for the specific conditions of a building to accommodate the required deflection and the end reactions of the studs. The deep leg tracks are not standard and the gauge, width and leg length must be specified for each particular application. All detailing and connections should be specified by a qualified engineer or architect.

Single slip track



Double slip track



Unimast Curtain Wall Slide Clips attach Unimast SJ or ST studs used in curtain wall applications to horizontal supports, while allowing vertical movement of the structure without transferring compressive loads to the studs.

The Unimast Curtain Wall Slide Clip resists tension loads caused by negative wind pressure (suction) on exterior curtain walls. Based on the gauge of stud being used, the safe design loads (lbs.) for the

slide clip are given in the table below. The safe design load is the maximum tension load of the stud/clip combination.

In addition to checking the tension created by negative wind pressure, web crippling of studs with respect to the bearing width must be checked for positive wind pressures. For continuous span conditions, the combined bending and web crippling at interior supports must be checked per AISI Sections C3.4 and C3.5.

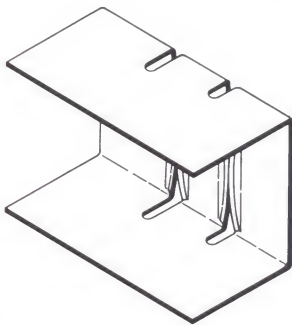
Table 32

**Curtain Wall Slide Clip:
Allowable Design Loads**

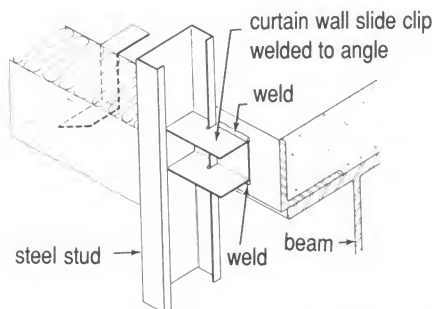
Stud Style	Stud Gauge/Thickness	Safe Designs Load (lbs) ⁽¹⁾
ST	20 (.0329")	432
SJ	20 (.0359")	482
SJ	18 (.0478")	514
SJ	16 (.0598")	638
SJ	14 (.0747")	638

(1) Check stud for combined bending and web crippling for positive loading, per 1986 AISI Specifications; Section C3.5.

Curtain wall slide clip



Curtain wall slide clip attachment



Curtain wall and interior partition wall surfaces should be isolated with control joints or other means where:

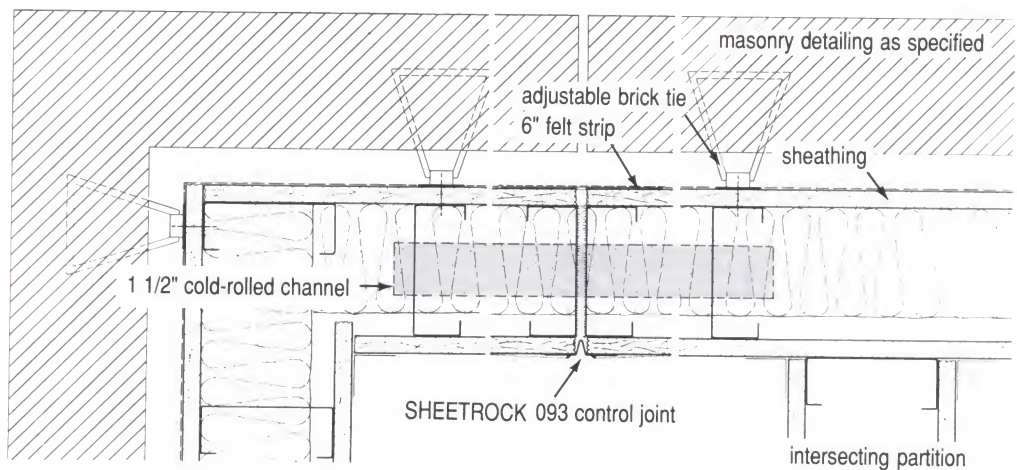
1. A curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling;
2. Construction changes within the plane of the wall;
3. Stucco surfaces exceed 10' in either direction;
4. The area within stucco sections exceeds 100 sq. ft.;
5. Required for brick-veneer construction by the Brick Institute of America especially below ledger angle supports;
6. Basic construction contains a control joint;
7. Interior partition run exceeds 30';
8. Exterior soffits exceed 30' in either direction.

Ceiling height door frames may be used as control joints. Less than ceiling height door frames should have control joints extending to the ceiling from both corners.

Framing at control joints that extend through the wall should have 1 1/2" cold-rolled channel alignment stabilizers spaced a maximum of 4' o.c. Channels should be placed through holes in the stud web and be securely attached to the first stud on each side of the control joint.

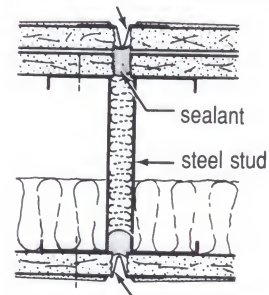
These recommendations are not complete for installation of control joints. Contact sheathing, gypsum board and exterior facing manufacturers for complete details and recommendations.

Exterior control joint (example showing brick veneer)



Interior control joint

SHEETROCK 093 control joint



SHEETROCK 093 control joint

Properly spaced horizontal steel bracing provides resistance to stud rotation and minor axis bending under wind and axial loads. Both stud flanges must be attached to top and bottom runner flanges to provide proper end support. Floor and ceiling runners must also be securely anchored to the structure. To fully utilize the stud's load carrying capacity, horizontal bracing must be installed at proper intervals.

Values in Axial Combined Load Tables are based on studs laterally braced with mechanical bracing installed at a maximum of 48" o.c. For allowable loads for studs with other than bracing 48" o.c., contact the Unimast Technical Departments. AISI Specifications, Section D4, contain methods for calculating the allowable axial loads using gypsum board or sheathing for lateral bracing. Unimast recommends the use of mechanical bracing, 48" o.c., for axially loaded studs, to ensure studs are properly braced during construction and/or remodeling when gypsum board or sheathing may not be present.

Lateral bracing consists of a field cut CR runner for solid bridging and steel

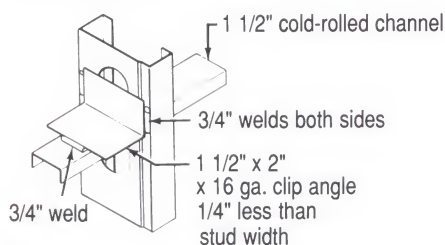
strap bracing on both sides of the studs. Solid bridging is placed at each end of the wall, adjacent to wall openings and 8' o.c. maximum. The solid bridging consists of a runner section with the web flange bent at each end which is then secured to each stud flange. Strap bracing, 1 1/2" wide and 20 gauge, is fastened to each stud flange with one screw and to each solid bridging runner section with four screws.

As an alternate, 1 1/2" cold-rolled channels may be used to brace studs laterally. Channels are inserted through the stud web holes and secured with screw-attached or welded 1 1/2" x 2" x 16 gauge clip angles cut-to-length 1/4" less than the stud width. For studs 3 5/8" or smaller, 16 gauge or heavier, the channel may be secured by welding both channel flanges to the stud.

Adequate lateral bracing must be provided during construction. One of the two methods described above, 1 1/2" cold-rolled channel or horizontal strap bracing, should be installed immediately after the studs are erected to prevent stud failure.

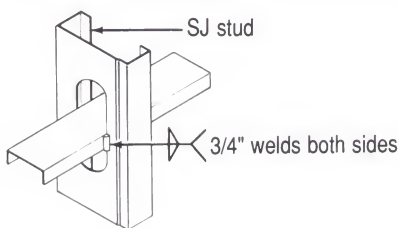
Lateral bracing weld attachment

(3 5/8" thru 8" members)

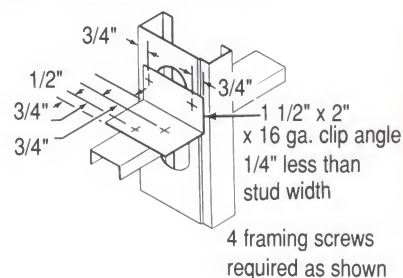


Lateral bracing weld attachment

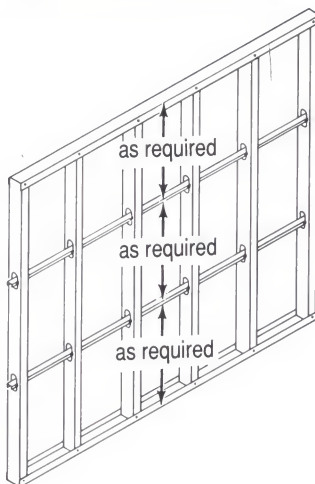
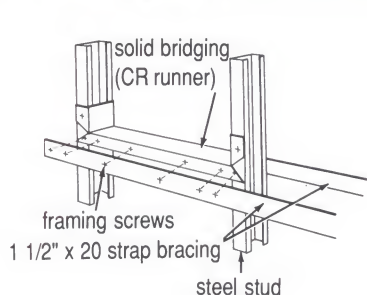
(3 5/8" or smaller members in 16 ga. or heavier thickness) (3 5/8" thru 8" members)



Lateral bracing screw attachment



Solid bridging



Buildings must be properly braced to resist racking under wind and seismic loads. In steel framed construction, diagonal strap bracing offers an economical and effective means to provide this resistance. Straps are sloped to resist racking forces in tension. They are installed over framing members and easily covered with facing materials.

The ends of diagonal straps are readily secured by screws or welds to transfer the tension load to the wall framing

and floor assembly. End connections must be designed to transfer accumulated design loads. At the foundation, floor anchors must be adequate to prevent uplift and horizontal shear.

Diagonal bracing and connections must be designed for the specific conditions of a building. For allowable load capacities of Unimast members and assistance in developing connections, contact the Unimast Technical Departments.

Table 33

Racking Bracing: Allowable Tension Capacity

Flat strap bracing (thickness)	Tension capacity (lb) ⁽¹⁾	Weld length (in) ⁽²⁾	1:1 slope (45°)	2:1 slope (63.5°)	
			Horizontal and vertical component (lbs)	Horizontal component (lbs)	Vertical component (lbs)
Flat strap bracing					
3"x14-ga. (.0697")	5,509	5¾	3,895	2,458	4,930
4"x14-ga. (.0697")	7,346	7½	5,194	3,278	6,574
5"x14-ga. (.0697")	9,182	9½	6,492	4,097	8,217
3"x16-ga. (.0548")	4,332	5¾	3,063	1,933	3,877
4"x16-ga. (.0548")	5,775	7½	4,083	2,577	4,625
5"x16-ga. (.0548")	7,219	9½	5,104	3,221	6,461

(1) Tension capacities based on steel having a design stress of 19.8 ksi. Yield strength (F_y) is 33 ksi. Ultimate strength of 35.64 ksi. Allowable stress increased 33% for wind and seismic loading. (2) Weld length is the minimum length of longitudinal fillet weld at each end of strap to develop tension capacity of strap.

Diagonal racking bracing

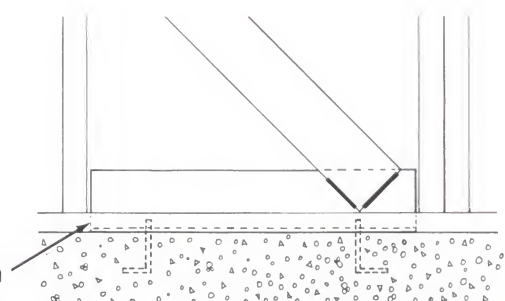
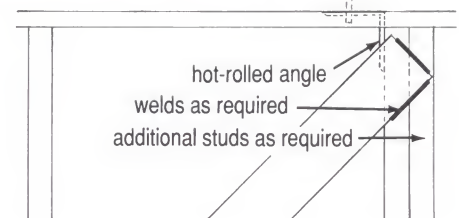
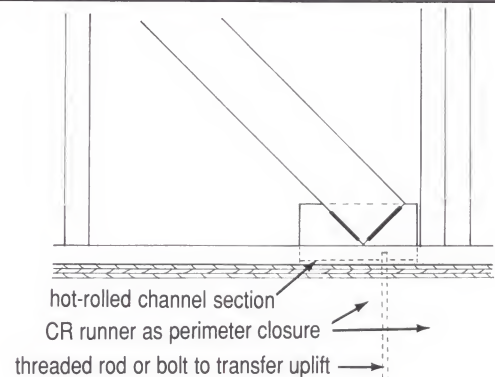
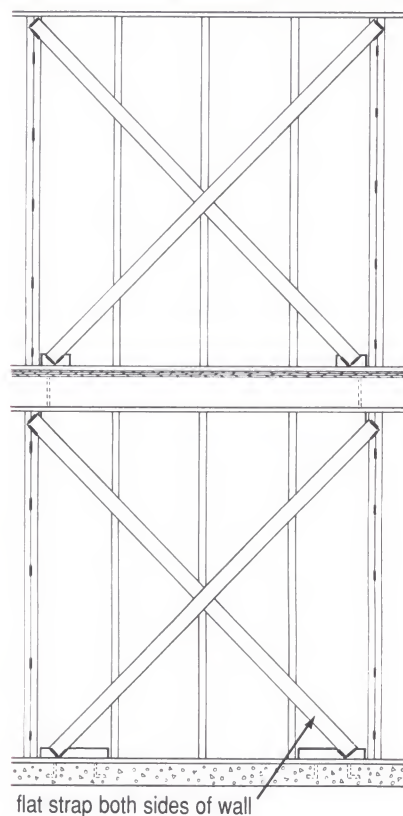


Table 34

SUPER-TITE Screws: Allowable Loads (lbs/fastener)⁽¹⁾

Gauge ⁽²⁾ (thickness)	3/4" Driller HWH 80S (14 x 3/4)		5/8" Driller Pan Head 35S (10 x 5/8)		7/16" Driller Pan Head 23S (7 x 7/16)	
	Shear	Pullout	Shear	Pullout	Shear	Pullout
22 (.0299")	187	103	170	60	142	55
20 (.0344")	213	113	193	72	163	62
18 (.0478")	327	123	273	110	223	100
16 (.0598")	420	175	343	150	N/A ⁽³⁾	N/A ⁽³⁾
14 (.0747")	577	260	402	210	N/A ⁽³⁾	N/A ⁽³⁾

(1) Factor of safety of 3.0 used. Values based on steel having a 33 ksi yield strength. Values for other steels are directly proportional to yield strengths. Values for shear also apply to bearing. (2) Loads are based on the thinnest metal in the attachment. (3) N/A-two steel thicknesses of this gauge can not be connected by this size screw.

Table 35

Bulldex Screws: Allowable Loads (lbs/fastener)⁽¹⁾

Gauge ⁽²⁾ (thickness)	No. 1/4-14 D = .188" T = .205"		No. 12-14 D = .160" T = .177"		No. 10-16 D = .138" T = .153"		No. 8-18 D = .120" T = .125"		No. 6-20 D = .104" T = .106"	
	Shear	Pullout	Shear	Pullout	Shear	Pullout	Shear	Pullout	Shear	Pullout
20 (.0359")	154	71	143	71	141	69	140	68	133	53
18 (.0479")	301	101	276	101	263	98	248	94	188	83
16 (.0598")	426	159	377	153	261	151	236	142	N/A ⁽³⁾	N/A ⁽³⁾
14 (.0747")	511	242	412	215	286	205	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾
12 (.1046")	585	352	450	324	327	314	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾

(1) Allowable loads based on Bulldex Report #845. Loads based on steel having 33 ksi yield strength and 1.08 Fy tensile strength. Loads are based on average test results divided by a factor of safety of 3.0. These may be increased by 33% for wind and seismic loads. (2) Loads are based on the thinnest metal in the attachment. (3) N/A-two steel thicknesses of this gauge can not be connected by this size screw.

Table 36

Power Driven Fasteners in Concrete: Allowable Loads (lbs/fastener)⁽¹⁾

Shank diameter	Minimum penetration	Type of loading	Concrete compression strength (psi)		
			2000	3000	4000
0.145"	1 1/8"	Shear	160	225	265
		Pullout	90	115	145
0.177"	1 1/16"	Shear	250	285	330
		Pullout	150	205	275
0.205"	1 1/4"	Shear	390	445	500
		Pullout	220	280	345

(1) Values are for lightweight or hard rock concrete. Allowable shear and pullout values are based on Hilti ICBO Research Report #2388. Minimum fastener spacing is 4" o.c. and minimum edge distance is 3".

Table 37a

Power Driven Fasteners in Structural Steel: Allowable Bearing Capacity (lbs/fastener)⁽¹⁾

Shank diameter	Steel thickness				
	20 gauge (.0344")	18 gauge (.0478")	16 gauge (.0598")	14 gauge (.0747")	12 gauge (.1046")
0.145"	189	263	329	411	576
0.177"	231	321	402	502	702
0.205"	267	372	465	581	814

(1) Bearing capacity is based on $F_u = 1.15 \times 33.0$ ksi. Allowable bearing capacity calculated per Section E 3.3 of the 1986 AISI Design Specifications.

Table 37b

Power Driven Fasteners in Structural Steel: Allowable Pull-out and Shear (lbs/fastener)⁽¹⁾

Cold rolled steel gauge	0.145" Shank Diameter			0.177" Shank Diameter			0.205" Shank Diameter		
	Hot Rolled Steel Thickness			Hot Rolled Steel Thickness			Hot Rolled Steel Thickness		
	1/4"	3/8"	1/2"	1/4"	3/8"	1/2"	1/4"	3/8"	1/2"
12 (.1046")	210	210	210	335	395	395	485	525	660
14 (.0747")	210	210	210	335	395	395	485	525	581
16 (.0598")	210	210	210	335	395	395	465	465	465
18 (.0478")	210	210	210	321	321	321	372	372	372
20 (.0344")	197	197	197	241	241	241	279	279	279

(1) Shear values are based on Hilti ICBO Research Report No. 2388. Tests were conducted with the fastener point driven completely through the back side of the hot rolled steel member. This was necessary to obtain proper gripping force.

Table 38

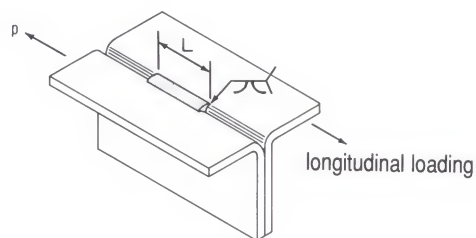
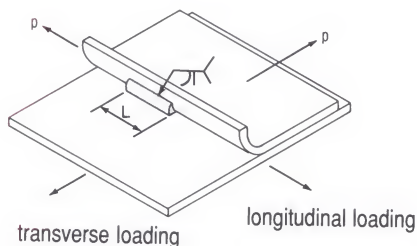
Welds: Allowable Loads (lb/in)⁽¹⁾

Gauge ⁽²⁾	Design thickness (in)	Weld size (in)	Fillet		Flare bevel-groove		Flare v-groove
			Longitudinal	Transverse	Longitudinal	Transverse	Longitudinal
20	.0344	5/32	368	490	368	408	368
18	.0478	1/8	511	681	511	568	511
16	.0598	1/8	640	853	640	710	640
14	.0747	1/8	799	1065	799	887	799
12	.1046	1/8	1118	1491	1118	1242	1118

(1) Loads based on steel having 33 ksi yield strength and 1.08 F_y tensile strength developed according to 1986 AISI Design Specifications and may be increased 33% for wind or seismic loads. When joining different gauge members, use load shown for lighter gauge. Loads are based on the thinnest metal in the attachment.

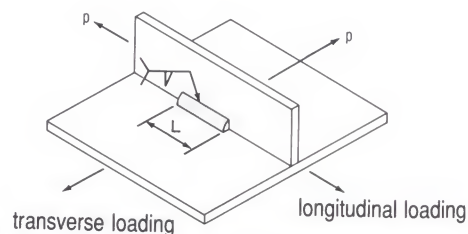
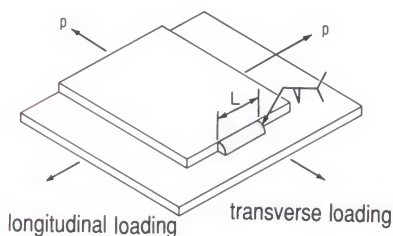
Flare-bevel groove weld

Flare V-groove weld



Lap joint fillet weld

T-joint fillet weld



1.0 General

2.0 Products

2.1 Materials

2.1.1 All studs and/or joists and accessories shall be made of the type, size, gauge and spacing shown on the drawings, and shall be manufactured by Unimast Incorporated.

2.1.2 All structural members shall be designed in accordance with American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members," 1986 edition.

2.1.3 All structural members shall be formed from corrosion-resistant steel, corresponding to the requirements of ASTM A446, Grade C (Grade D)(Grade A), with a minimum yield strength of 40 ksi (50 ksi)(33ksi) for SJ studs and Grade A, 33 ksi, for CR runners.

2.1.4 All structural members shall be zinc coated meeting ASTM A525, G-60, or equivalent.

3.0 Execution

3.1 Fabrication

3.1.1 Prior to fabrication of framing, the contractor shall submit fabrication and erection drawings to the architect or engineer to obtain approval.

3.1.2 Prefabricated panels shall be square, with components attached in a manner to prevent racking and to minimize distortion while lifting and transporting.

3.1.3 All framing components shall be cut squarely for attachment to perpendicular members or, as required, for an angular fit against abutting members.

3.1.4 All framing components shall be plumbed, aligned and leveled.

3.1.5 In all doubled jamb studs and doubled headers not accessible to insulation contractors, insulation equal to that specified elsewhere shall be provided.

3.1.6 Fastening of components shall be with self-drilling screws or welding. Screws and welds shall be of sufficient size to ensure the strength of the connection. Wire tying of components shall not be permitted. All welds shall be touched-up with a zinc-rich paint.

3.1.7 Splices in framing components, other than runner track, shall not be permitted.

3.1.8 Abutting lengths of runner shall be butt-welded, spliced or each length securely anchored to a common structural element.

Runners shall be securely anchored to the supporting structure as shown on the drawings.

3.1.9 Temporary bracing, where required, shall be provided until erection is complete.

3.2 Installation

(non-load bearing curtain walls)

3.2.1 Studs shall be secured to continuous runner tracks unless the stud end terminates at deflection track.

3.2.2 Installation of curtain wall framing shall accommodate vertical displacement of () of the primary frame. This shall include slide clips and deflection slip tracks as shown on the drawings.

3.2.3 Framing of wall openings shall include headers and jambs as shown on the drawings.

3.3 Installation (axial load bearing walls)

3.3.1 Axially loaded studs shall be installed so the ends are positioned against the inside of the runner track web prior to fastening and shall be attached to both flanges of the upper and lower runner tracks.

3.3.2 Complete, uniform and level bearing support shall be provided for the bottom runner.

3.3.3 Framing of wall openings shall include headers and supporting studs as shown on the drawings.

3.3.4 Resistance to bending and rotation about the minor axis shall be provided by horizontal strap and blocking or cold-rolled channel bracing as shown on the drawings.

3.3.5 Diagonally braced stud walls, as indicated on the drawings, shall be provided at locations designated as "shear walls" for frame stability and lateral load resistance. Additional studs, when necessary, shall be positioned as indicated on the drawings and adequately attached to the structure to resist the vertical components of the loads.

3.4 Installation (joists)

3.4.1 Uniform and level joist bearing shall be provided at the foundation walls by means of shims and/or non-settling grout.

3.4.2 Joists shall be located directly over bearing studs, or a load distribution member shall be provided at the top of the bearing wall.

3.4.3 Web stiffeners shall be provided at reaction points and/or at points of concentrated loads where indicated on the drawings.

3.4.4 Joist bridging shall be provided where indicated on the drawings.

3.4.5 Additional joists shall be provided under parallel partitions when the partition length exceeds one-half the joist span, and around all floor and roof openings which interrupt one or more spanning members, unless otherwise noted.

3.4.6 End blocking shall be provided where joist ends are not otherwise restrained from rotation.

Division 5: Metals

05400 Cold Formed Metal Framing

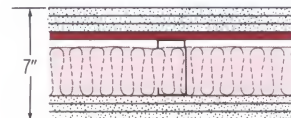


**4-Hour Rated Partitions
(Non-load Bearing)**

wt. 17

Unimast 1 5/8" Steel Stud 24" o.c.-4 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side-base layers applied vert-face layer applied horiz-panels screw attached w/joints stag & fin-perimeter caulked-rating based on assembly with or without SAFB's-rating also applies with IMPERIAL gypsum base, FIRECODE C core, and veneer finish surface-UL Des U435

62 STC Based on assembly with 1 1/2" SAFB's in cavity-SA-830113

**3-Hour Rated Partitions
(Non-load Bearing)**

wt. 14

Unimast 35SJ20 studs 24" o.c. - RC-1 channel one side spaced 24" o.c. screw attached to studs-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-3" THERMAFIBER SAFB's-3 layers gypsum panels screw-attached to studs, 3 layers screw-attached to channels-panels applied vert with joints staggered-joints finished-perimeter caulked-UL Des U455

63 STC RAL-TL-87-152 (58 MTC)

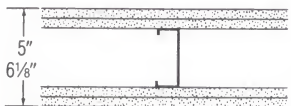
65 STC 60SJ20, 5" SAFB's, RAL-TL-87-143 (61 MTC)



wt. 13

Unimast 1 5/8" Steel Stud 24" o.c.-3 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side-base layers applied vert-face layer applied horiz-panels screw-attached with joints staggered & fin-perimeter caulked-rating based on assembly with or without SAFB's-rating also applies with IMPERIAL gypsum base, FIRECODE C core, and veneer finish surface-UL DES U435

59 STC Based on assembly with 1 1/2" SAFB's in cavity-SA-830112

**2-Hour Rated Partitions
(Non-load Bearing)**

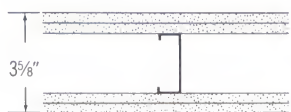
wt. 12

Unimast 2 1/2" or 3 5/8" Steel Stud 24" o.c.-2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, plain or vinyl faced vert applied each side-base layer screw attached-face layer laminated or screw-attached-joints finished or unfinished-perimeter caulked-UL Des U411-rating also applies with plain panels horiz-GA-WP-1548

48 STC Based on 3 5/8" studs and 5/8" FIRE CODE "C" panels-BBN-770408

51 STC Based on 2 1/2" SAFB's in cavity-GA-WP-1548

56 STC Based on 2" SAFB's in cavity-USG-840819



wt. 9

Unimast 1 5/8" Steel Studs 24" o.c.-2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core-2 layers each side vert applied & screw-attached-joints finished-U of C 6-15-65

N/A



wt. 10

Unimast 2 1/2" or 3 5/8" Steel Studs 24" o.c.-2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side - 1", 1 1/2" or 2" THERMAFIBER SAFB's stapled-panels applied vert & joints staggered-base layer screw-attached - face layer strip laminated or screw-attached - joints finished-perimeter caulked-rating based on assembly with or without sound attenuation blankets-UL Des U412

50 STC Based on 3 5/8" stud assembly with out SAFB's-USG-840817

55 STC Based on 3 5/8" studs and 1 1/2" SAFB's-SA-800421

52 STC Based on lamin. face layer, 1 1/2" SAFB's and 2 1/2" studs-SA-860932

54 STC Based on 2 1/2" studs, screw-att face layer and 1 1/2" SAFB's-CK-654-40

Unimast 35SJ20 studs 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-3" THERMAFIBER SAFB's-RC-1 channel one side spaced 24" o.c. screw-attached to studs-2 layers gypsum panels screw-attached to channels, 2 layers screw-attached to studs-panels appl vert with joints staggered-joints fin-perimeter caulked-**UL-Des U454**

60 STC **RAL-TL-87-154** (54 MTC)

61 STC Based on 5/8" thick panels-**RAL-TL-83-214** (57 MTC)

2-Hour Rated Partitions (cont.) (Non-load Bearing)



wt. 10

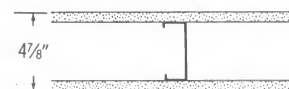
Unimast 3 5/8" Steel Studs 24" o.c.-5/8" SHEETROCK brand gypsum panels, FIRECODE core-single layer panels vert or horiz applied & screw-attached-joints staggered & finished-perimeter caulked-**UL Des U465**-based on panels horiz applied-**GA-WP-1200**

40 STC **USG-860808**

49 STC Based on 3" SAFB's in cavity panels **SA-870717**

51 STC Based on 3" SAFB's 25" wide, creased to fit cavity-**TL-85-128**

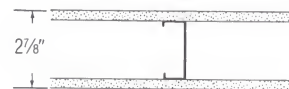
1-Hour Rated Partitions (Non-load Bearing)



wt. 6

Unimast 1 5/8" steel studs 24" o.c.-5/8" SHEETROCK brand gypsum panels, FIRECODE core-single layer panels vert applied & screw-attached 12" o.c.-joints fin-perimeter caulked-**U of C 7-31-62**

38 STC **USG-860809**



wt. 5

Unimast 2 1/2" steel studs 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-single layer panels each side applied vert & screw-attached-1 1/2" THERMAFIBER SAFB's-joints fin-perimeter caulked-**UL Des U448**

45 STC **TL-69-42**

48 STC Based on 3 5/8" studs & 2" SAFB's-**SA-800422**

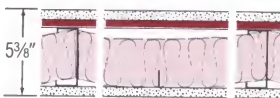


wt. 5

Unimast 3 5/8" Steel Studs 24" o.c., 5/8" SHEETROCK brand gypsum panels, FIRECODE core-3" THERMAFIBER SAFB's 25" wide creased to fit cavity- RC-1 channels 24" o.c. screw-attached one side-panels vert applied & screw-attached-joints staggered & finished-perimeter caulked-**UL Des U451**

55 STC **SA-850415**

54 STC Based on 24" wide SAFB's-**USG-850409**



wt. 6

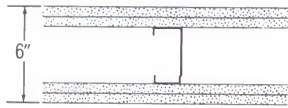
Unimast 35SJ20 studs 24" o.c.-four layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side-1", 1 1/2", 2" or 3" THERMAFIBER SAFB's optional-base layers applied vert with joints staggered-base panels attached with Type S-12 screws 48" o.c.-face layer applied vert or horiz with 2 5/8" Type S-12 screws 12" o.c. and 1 1/2" Type G screws in panels-rating also applies with IMPERIAL gypsum base, FIRECODE C core, and veneer finish-load bearing up to 100% allowable stud axial load-**UL Des U426**

N/A

3-Hour Rated Partitions (Load Bearing)



wt. 18

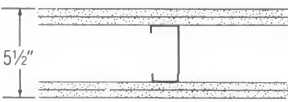
**2-Hour Rated Partitions
(Load Bearing)**

wt. 10

Unimast 35SJ20 studs 24" o.c.-Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE core-panels applied vert-base layer attached with 1" Type S-12 screws 12" o.c.-face layer attached with 1 5/8" Type S-12 12" o.c.-joints finished-load bearing up to 80% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 5/8" SHEETROCK brand gypsum sheathing, FIRECODE core, on exterior.)

48 STC Based on 2" SAFB's in cavity-USG-811006

49 STC Based on 2" SAFB's and 60SJ20 stud-USG-810937

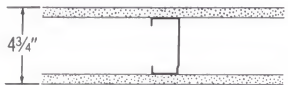
**1 1/2-Hour Rated Partitions
(Load Bearing)**

wt. 9

Unimast 35SJ20 studs 24" o.c.-Dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core-panels applied vert-base layer attached with 1" Type S-12 screws 12" o.c.-face layer att with 1 5/8" Type S-12 screws 12" o.c. - joints fin-load bearing up to 100% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, on exterior.)

49 STC Based on 2" SAFB-USG-811009

49 STC Based on 2" SAFB's and 60SJ20 studs-USG-810940

**1 1/2-Hour Rated Partitions
(Load Bearing)**

wt. 6

Unimast 35SJ20 studs 24" o.c.-5/8" SHEETROCK brand gypsum panels, FIRECODE core-panels applied vert & attached with 1" Type S-12 screw 12" o.c.-joints finished-load bearing up to 100% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 5/8" SHEETROCK gypsum sheathing, FIRECODE core, on exterior.)

40 STC USG-810519

41 STC Based on 2" SAFB's in cavity-USG-810518

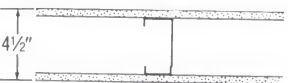
Unimast 35SJ20 studs 24" o.c.-Dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core-1", 1 1/2", 2" or 3" THERMA-FIBER SAFB's-RC-1 channels one side spaced 24" o.c. screw-attached to studs-panels applied vert with joints staggered-base layer attached with 1" Type S-12 screws 12" o.c.-face layer attached with 1 5/8" Type S-12 screws 12" o.c.-joints finished-rating also applies with IMPERIAL gypsum base, FIRECODE C core and veneer finish surface-load bearing up to 100% allowable stud axial load-UL Des U440

61 STC Based on 35SJ16 studs, 5/8" panels, lateral bracing and 3" SAFB's in cavity-SA-830628

51 STC Based on 35SJ16 studs and lateral bracing-SA-840715



wt. 10

**45-Minute Rated Partitions
(Load Bearing)**

wt. 6

Unimast 35SJ20 studs 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-panels applied vert & attached with 1" Type S-12 screws 12" o.c.-joints finished-load bearing up to 100% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, on exterior.)

47 STC Based on 3" SAFB's in cavity-SA-861001

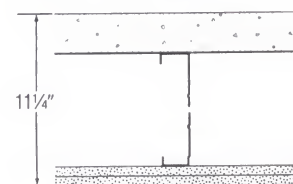
Unimast 75SJ18 steel joists 24" o.c.-2 1/2" concrete floor over corrug steel deck-dbl layer 5/8" SHEETROCK brand gypsum panel, FIRECODE C core, ceiling-base panels attached with 1" Type S-12 screws 12" o.c.-face panels attached with 1 7/8" Type S-12 screws 12" o.c.-joints staggered and finished-estimated rating based on witnessed laboratory test.

44 STC **KAL-443533**

73 IIC Based on carpet and pad-**KAL-443680**

47 STC Based on USG RC-1 channel 24" o.c.-**KAL-443534**

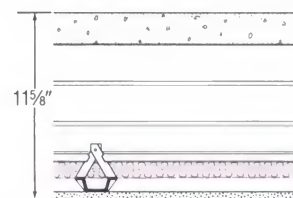
2-Hour Rated Ceilings



clg. wt. 5

Unimast 725SJ18 steel joists 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-2" concrete over corrug steel deck-drywall furring channel 24" o.c. clip - attached to joist-1" THERMAFIBER insulation laid over channel below joists-panels screw-attached to channels 12" o.c.-joints finished-**UL Des G533**

N/A



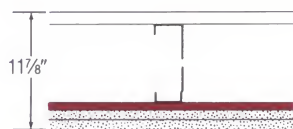
clg. wt. 3

Unimast 95SJ16 steel joists 24" o.c.-3/4" T&G plywood flr attached to joists with Type S-12 screws 24" o.c.-dbl layer 5/8" SHEETROCK brand gypsum panel, FIRECODE C core, ceiling attached to RC-1 channel screw attached to joist 16" o.c.-base panels attached with 1" Type S-12 screws 24" o.c.-face panels attached with 1 5/8" Type G screws 8" o.c. at butt joints, 1 5/8" Type S screws 12" o.c. in field-joints finished-**UL Des L527**

48 STC **USG-771101**

51 STC Based on carpet & pad-**SA-781110**

1 1/2-Hour Rated Ceilings



clg. wt. 5

Unimast 725SJ18 steel joists 24" o.c.-dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling and 5/8" T&G plywood flr attached to joists with Type S-12 screws-dbl layer gypsum panels around beam-joints exp-includes unrestrained beam-**UL Des L524**

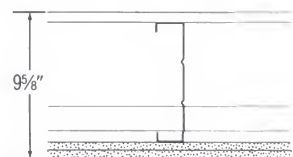
39 STC Based on 95SJ16 joists-**USG-760105**

43 STC Based on 95SJ16 joists and 3" SAFB's-**USG-760310**

56 IIC Based on 95SJ16 joists and carpet & pad-**USG-760106**

60 IIC Based on 95SJ16 joists and carpet & pad with 3" SAFB's-**USG-760405** (insulation may affect fire rating)

1-Hour Rated Ceilings

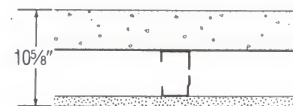


clg. wt. 3

Unimast 75SJ18 steel joists 24" o.c.-2 1/2" concrete flr on corrug steel deck-5/8" SHEETROCK brand gypsum panels, FIRECODE C core, attached to joists with 1" Type S-12 screws 12" o.c.- joints fin-estimated fire rating based on witnessed laboratory test

45 STC Based on USG RC-1 resilient channels 24" o.c.-**KAL-443536**

70 IIC Based on carpet & pad-**KAL-443535**



clg. wt. 3

These pages do not include all of the fire and sound rated steel framing systems which were tested with Unimast Incorporated's steel framing. For additional systems, including plaster assemblies, column applications and chase wall systems, see U.S. Gypsum's "Construction Selector", SA-100 (Sweet's 09200).

Table 39

SN: Physical Properties

Member	Dimension			t ⁽¹⁾ (in)	ANET ⁽¹⁾ (in ²)	Weight ⁽²⁾	
	A	B	C			lb/ft	kg/m
358SN20	3.573	1.375	0.438	0.0329	0.177	0.77	1.15
358SN18	3.573	1.375	0.438	0.0438	0.233	1.02	1.52
358SN16	3.573	1.375	0.375	0.0548	0.282	1.24	1.85
358SN14	3.573	1.375	0.375	0.0697	0.354	1.56	2.32
600SN20	5.921	1.375	0.438	0.0329	0.254	1.03	1.54
600SN18	5.921	1.375	0.438	0.0438	0.336	1.37	2.04
600SN16	5.921	1.375	0.375	0.0548	0.411	1.63	2.50
600SN14	5.921	1.375	0.375	0.0697	0.517	2.11	3.15
800SN18	7.921	1.375	0.438	0.0438	0.424	1.44	2.15
800SN16	7.921	1.375	0.375	0.0548	0.520	2.05	3.05
800SN14	7.921	1.375	0.375	0.0697	0.657	2.59	3.86

(1) Design thickness without coating. (2) Average shipping weight excluding coating.

Table 40

SN: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties				Torsional Properties				Ma (k-in)
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	J (in ⁴)	C _w (in ⁶)	X _o (in)	j (in)	
358SN20	0.0329	0.2263	0.446	0.246	0.060	0.063	1.404	0.513	0.446	0.245	0.049	0.059	0.00008	0.1663	1.080	2.033	5.332
358SN18	0.0438	0.2989	0.585	0.323	0.077	0.081	1.400	0.508	0.585	0.320	0.063	0.076	0.00019	0.2138	1.069	2.032	7.138
358SN16	0.0548	0.3641	0.707	0.390	0.088	0.099	1.393	0.491	0.707	0.387	0.072	0.084	0.00036	0.2319	1.015	2.056	8.806
358SN14	0.0697	0.4582	0.879	0.485	0.107	0.121	1.385	0.483	0.879	0.481	0.088	0.103	0.00074	0.2807	1.000	2.058	11.240
600SN20	0.0329	0.3035	1.478	0.493	0.069	0.066	2.207	0.477	1.477	0.496	0.053	0.060	0.00011	0.4958	0.868	3.551	10.795
600SN18	0.0438	0.4017	1.944	0.648	0.089	0.085	2.200	0.472	1.944	0.652	0.076	0.081	0.00026	0.6403	0.858	3.572	14.537
600SN16	0.0548	0.4928	2.358	0.786	0.101	0.103	2.187	0.454	2.357	0.791	0.094	0.093	0.00049	0.7141	0.812	3.689	18.008
600SN14	0.0697	0.6218	2.948	0.983	0.124	0.127	2.178	0.446	2.948	0.989	0.114	0.113	0.00100	0.8698	0.798	3.726	23.120
800SN18	0.0438	0.4893	3.965	0.991	0.096	0.087	2.847	0.443	3.964	0.998	0.077	0.081	0.00031	1.2332	0.738	5.659	22.231
800SN16	0.0548	0.6024	4.823	1.206	0.108	0.106	2.829	0.424	4.821	1.213	0.096	0.093	0.00060	1.3870	0.697	5.881	27.621
800SN14	0.0697	0.7612	6.046	1.512	0.132	0.129	2.818	0.417	6.044	1.521	0.125	0.116	0.00123	1.6935	0.684	5.964	35.559

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33 ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot dipped per A525). (2) Design thickness without coating. (3) Deflection determination.

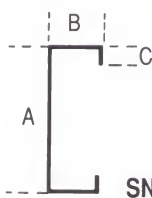
Table 41

SN Studs: Curtain Wall Limiting Heights

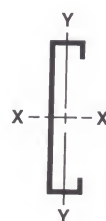
Stud Properties Only

Wind load	Deflection limitation	Stud spacing (in o.c.)	358 SN (3 1/8")				600 SN (6")				800 SN (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	12'6"	13'8"	14'7"	15'8"	18'7"	20'5"	21'10"	23'5"	25'11"	27'7"	29'10"
		16	11'5"	12'5"	13'2"	14'2"	16'11"	18'6"	19'10"	21'4"	23'6"	25'1"	27'1"
		24	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
20 psf	L/360	12	10'11"	11'11"	12'8"	13'8"	16'4"	17'9"	19'0"	20'6"	22'7"	24'1"	26'0"
		16	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		24	8'9"	9'6"	10'1"	10'11"	12'11"	14'1"	15'1"	16'4"	17'11"	19'2"	20'7"
25 psf	L/240	12	11'5"	12'5"	13'2"	14'2"	16'11"	18'6"	19'10"	21'4"	23'6"	25'1"	27'1"
		16	10'4"	11'4"	12'0"	12'11"	15'5"	16'9"	18'0"	19'5"	21'5"	22'10"	24'7"
		24	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
30 psf	L/360	12	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		16	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
		24	7'11"	8'7"	9'2"	9'11"	11'8"	12'11"	13'8"	14'10"	16'4"	17'5"	18'10"
35 psf	L/240	12	10'6"	11'6"	12'4"	13'2"	15'8"	17'2"	18'5"	19'10"	21'10"	23'4"	25'1"
		16	9'7"	10'6"	11'2"	12'0"	14'4"	15'7"	16'8"	18'0"	19'5"	21'2"	22'10"
		24	8'5"	9'2"	9'8"	10'6"	12'6"	13'8"	14'7"	15'8"	16'11"	18'6"	19'11"
40 psf	L/360	12	9'2"	10'1"	10'8"	11'6"	13'8"	15'0"	16'0"	17'4"	19'1"	20'5"	21'11"
		16	8'5"	9'2"	9'8"	10'6"	12'6"	13'8"	14'7"	15'8"	16'11"	18'6"	19'11"
		24	7'4"	8'0"	8'6"	9'2"	10'11"	11'11"	12'8"	13'8"	15'1"	16'2"	17'5"
45 psf	L/240	12	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		16	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
		24	7'11"	8'7"	9'2"	9'11"	11'8"	12'11"	13'8"	14'10"	16'4"	17'5"	18'10"
50 psf	L/360	12	8'8"	9'6"	10'1"	10'11"	12'11"	14'1"	15'1"	16'4"	17'11"	19'2"	20'7"
		16	7'11"	8'7"	9'2"	9'11"	11'8"	12'11"	13'8"	14'10"	16'4"	17'5"	18'10"
		24	6'11"	7'6"	8'0"	8'7"	10'2"	11'2"	12'0"	12'11"	14'2"	15'2"	16'5"

Limiting heights are for SN members with 33 ksi yield strength (F_y) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of studs alone increased 33% for wind loading. See Design Considerations, page 34.



SN physical properties



SN structural properties

Unimast Incorporated's product catalogs are available from the Unimast Customer Service Centers. Also, call for additional copies of this literature and for more information on Unimast Incorporated.

- CS-13 Steel Framing Components and Accessories for Drywall, Plaster and Load-bearing Construction
- UN-29 Certification of Material
- UN-4 Unimast Incorporated
- UN-30 Steel Framing Systems: Technical Information

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- SA-100 United States Gypsum Company Construction Selector
- SA-920 United States Gypsum Company Plaster Products, Accessories and Systems
- SA-923 United States Gypsum Company Drywall/Steel Framed Systems



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Unimast Incorporated acknowledges Professor Karl H. Klippstein, P.E., University of Pittsburgh, Structural Engineering Consultant, and Matsen Ford Design Associates, Inc., Pewaukee, Wisconsin, and Baltimore, Maryland, for assistance in preparing the technical information.

All details, specifications and data computations contained in this literature are intended as a general guide for use in construction. These products must not be used in the design or construction of any structure without complete and detailed evaluation by a qualified engineer or architect to verify the suitability of these particular products for use in any given structure. Because physical properties among competitive products vary, information from this publication should be used only with Unimast studs and runners. Unimast Incorporated assumes no liability for failure resulting from the use of its drawings, specifications or computations or for failure resulting from the use of alternative materials or improper application or installation.



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● DUROCK Exterior Cement Board Systems



● Exterior walls and ceilings with a variety of finishes:

- Stucco
- Thin brick
- Ceramic tile
- Stone aggregate

USG



On the cover: All Children's
Hospital Medical Office Building,
St. Petersburg, Florida
Architect: Karlsberger & Associates
Architects Inc.
Developer: The Cogdell Group, Inc.

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Attractive, Efficient Exteriors Engineered for High Performance

DUROCK Exterior Cement Board Systems offer architects and builders lightweight, fire-resistant assemblies for steel-framed and wood-framed exteriors. Utilizing conventional materials, methods and equipment, these high-performance systems are suitable for many types of structures. Specially formulated DUROCK Exterior Cement Board is readily attached to wood or steel framing spaced max. 16" o.c. Large-size panels are nailed or screwed to wood studs and screw-attached to steel studs. The DUROCK Exterior Cement Board serves as a base for ceramic tile, thin brick, epoxy matrix stone aggregate surfacing and DUROCK Exterior Basecoat and Finish. In addition, the board may serve as the sheathing in exterior insulation and finish systems (EIFS).

DUROCK Exterior Cement Board, formed in a continuous process, consists of an aggregated portland cement core reinforced with polymer-coated, glass-fiber mesh embedded in both surfaces. Boards are made 1/2" thick and 48" wide, cut to 8' lengths, and cured before shipment. Other sizes are available on special order. Ends are square cut and edges reinforced and finished smooth.

Tested System Performance

DUROCK Exterior Cement Board Systems secured to steel studs or wood studs were extensively in-house and independent laboratory tested. Deformation under compressive and flexural loads, water permeance, cyclic freezing and thawing, wetting and drying were analyzed.

Recognized by National Evaluation Report No. NER 396 (CABO:BOCAL, ICBO, SBCCI).

DUROCK Exterior Systems with tile and thin brick meet the requirements of the Ceramic Tile Institute and are included in its Tested Material List.

**TESTED
MATERIAL**



LISTED 34L2
**For floor protectors
and wall shields.**

Benefits

Design Freedom—These systems provide a wide choice of architectural style, color and texture, while minimizing variance of cost and performance. Surface versatility, material economy and conventional application techniques make these systems ideal for many structures: light commercial (office buildings, hotels, motels, stores and shopping centers); institutional (schools, clinics, hospitals and nursing homes); residential (apartments, townhouses and homes); and industrial buildings.

Low In-Place Cost—Labor time required and installed cost are less than many other exterior systems. Large 4' x 8' panels install easily with nails or screws. Buildings can be closed-in quickly, allowing interior construction to proceed. Assembly can be adapted readily to factory or jobsite panelization.

Versatile—Systems adapt easily to basic design concepts. Can be used as curtain wall, spandrel or infill panels to meet esthetic needs. Color and texture may be varied to contrast or complement glass and other exterior materials. The same substrate can be used for ceramic tile, thin brick, stone aggregate, EIFS and DUROCK Exterior Finish, either in combination or on different faces of the building.

Detailing—Layering DUROCK Exterior Cement Board can provide esthetic detailing with design options such as quoins, lintels, dentils, banding and keystones. Fabrication may be in single or double layer.

Sheathing for EIFS—DUROCK Exterior Cement Board is an excellent sheathing for use in EIFS because, unlike gypsum board, it will not soften or delaminate after prolonged exposure to moisture.

Lightweight—These systems weigh considerably less than masonry or precast or poured concrete, reducing structural foundation requirements.

Fire Resistance—Both 1- and 2- hour fire-resistance ratings are achieved with wood or steel studs. See table, page 5, for fire-rated assemblies.

Superior Performance—DUROCK Exterior Cement Board systems are weather-resistant, withstand high temperature, humidity, water, wind, and repeated freeze-thaw cycles. The board provides a strong, durable substrate for thin brick, tile, stone aggregate, EIFS and DUROCK Exterior Finish.

Framing Systems

Wood Framing—Load-bearing or non-load bearing construction is provided with conventional wood studs spaced 16" o.c. max.

Steel Framing—Load-bearing or non-load bearing construction is provided with 20-ga. or heavier steel studs or channels, with corrosion-resistant coating equivalent to G60 hot dipped galvanized, spaced a maximum 16" o.c. (24" o.c. EIFS applications). Refer to SA-923, *Drywall/Steel-Framed Systems*.

Insulation

For increased thermal resistance and sound attenuation, THERMAFIBER FS-15 Insulation or SAFB blankets may be inserted into the wall cavity. These products may be required in listed fire-rated assemblies.



Exterior Surfaces

Ceramic tile, thin brick, stone aggregate set in an epoxy matrix, DUROCK Exterior Finish or EIFS may be used as the exterior facing, as described below:

For all DUROCK Exterior Cement Board Systems

- An approved water barrier, installed over the framing or stapled to back of DUROCK Exterior Cement Board.
- DUROCK Exterior Cement Board, attached to steel framing using DUROCK Steel Screws, or to wood framing using DUROCK Wood Screws or hot-dipped galvanized roofing nails.
- DUROCK Exterior Tape, applied over all panel joints.

For Tile and Thin Brick Systems

- DUROCK Latex Fortified Mortar applied $\frac{1}{8}$ " thick over the entire DUROCK Exterior Cement Board surface.
- DUROCK Latex Fortified Mortar applied as the bond coat for ceramic tile and thin brick; and DUROCK Latex Fortified Grout used to fill joints between units.

For Exposed Aggregate Systems

- Epoxy matrix finish with stone aggregate applied over the entire DUROCK Exterior Cement Board surface.

Consult manufacturer of ceramic tile, thin brick and aggregated epoxy matrix to determine its suitability as an exterior surface and to obtain complete application instructions.

For DUROCK Exterior Finish System

- DUROCK Exterior Basecoat, applied over DUROCK Exterior Cement Board according to directions.
- DUROCK Exterior Finish coat, ready-mixed for application over DUROCK Exterior Basecoat according to directions. It can be applied or finished in any of many common textures. Quoins, dentils, lintels, or other architectural elements can be installed over basecoated DUROCK Exterior Cement Board and decorated with DUROCK Exterior Finish.

For Exterior Insulation and Finish Systems (EIFS)

- Follow the design and application recommendations provided by the EIFS manufacturer. When applying insulation board to DUROCK

Exterior Cement Board, always use the full bond method.

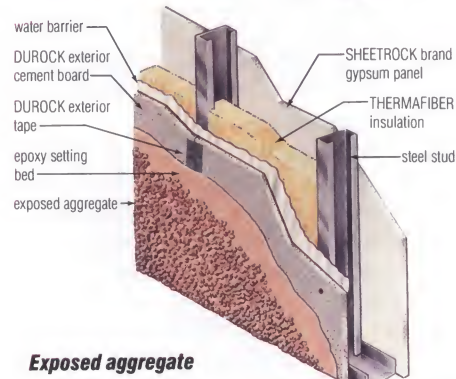
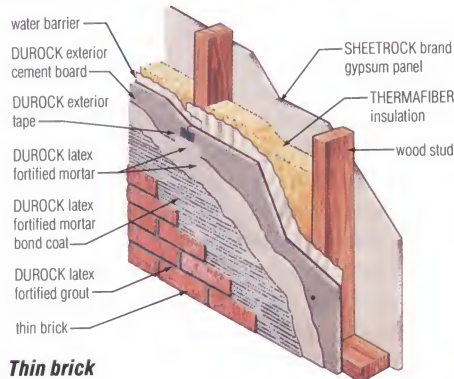
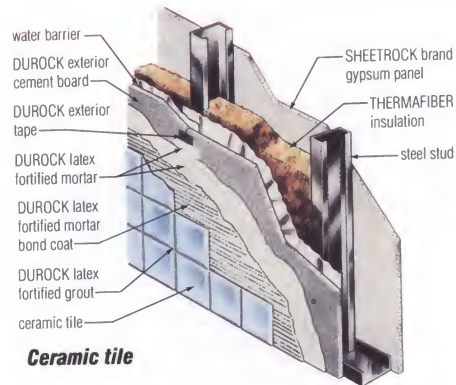
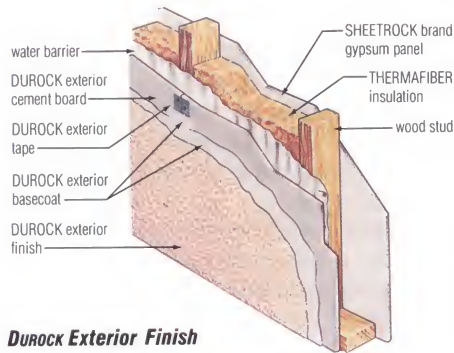
Interior Surfaces


Gypsum drywall, high-strength veneer plaster on gypsum base or ceramic tile applied to DUROCK Interior Cement Board may be used as the interior surface. For application of DUROCK Interior or Exterior Cement Board on interiors, see technical folder SA-932 in this series and in Sweet's General Building and Homebuilding Files. Technical assistance and consultation from experienced technical representatives are available. See back cover for phone numbers.

Limitations


- 1 Maximum stud spacing: 16" o.c. for exterior wall assemblies, 24" o.c. for cavity shaft wall assembly and EIFS; maximum allowable deflection, based on stud properties only, L/360 for tile and thin brick finishes, L/240 for DUROCK Exterior Finish and EIFS.
- 2 These systems must not be used for non-vertical exterior applications except as follows: DUROCK Exterior Systems finished with ceramic tile, thin brick, epoxy matrix stone aggregate and DUROCK Exterior Finish may be used on sills sloped a minimum of 10 degrees and up to 2' 0" deep provided that the framing is 16" o.c., $\frac{1}{2}$ " minimum structural sheathing is placed behind the DUROCK Exterior Cement Board, and the installation is adequately caulked, flashed and waterproofed.
- 3 DUROCK Exterior Cement Board may not be used as a structural sheathing—for racking resistance, separate bracing must be specified.
- 4 These systems are designed for positive or negative uniform loads up to 40 psf with studs spaced 16" o.c. max. They can be installed on structures up to four stories high. Consult your local United States Gypsum Company Technical Representative for applications beyond the scope of this technical literature.



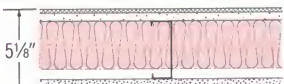

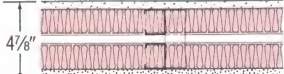
**1-Hour Walls****Wood-Framed/Load Bearing**
 **THERMAFIBER Insulation**

Detail/Physical Data	Description	Fire Test	Reference
	<p>1/2" DUROCK exterior cement board and 1/4" ceramic tile exterior—board attached with 1 5/8" DUROCK wood screws or 1 1/2" hot dipped galvanized roofing nails 8" o.c.—2x4 studs spaced 16" o.c.—3 1/2" THERMAFIBER FS-15 insulation between studs—5/8" SHEETROCK brand gypsum panels, FIRECODE core, or IMPERIAL FIRECODE gypsum base and 1/16" IMPERIAL finish interior</p>	UL Des U329	A

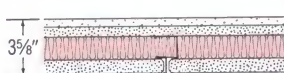
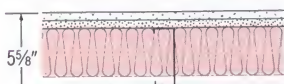
Steel-Framed/Load Bearing

	<p>1/2" DUROCK exterior cement board—base layer 5/8" SHEETROCK brand gypsum panels, FIRECODE core—3 1/2" 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 5/8" DUROCK steel screws 8" o.c.—joints taped—5/8" SHEETROCK brand gypsum panels, FIRECODE core, interior</p>	UL Des U473	B
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Steel-Framed/Non-Load Bearing

	<p>1/2" DUROCK exterior cement board and 1/4" ceramic tile exterior—board screw-attached with 1 1/4" DUROCK steel screws 8" o.c. to 3 5/8" min., 20-ga. min. studs spaced 16" o.c.—3" THERMAFIBER SAFB insulation between studs—5/8" SHEETROCK brand gypsum panels, FIRECODE core, or IMPERIAL FIRECODE gypsum base and 1/16" IMPERIAL finish interior</p>	UL Des U442	C
	<p>1/2" DUROCK exterior cement board—3 5/8" min., 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board screw-attached with 1 1/4" DUROCK steel screws 8" o.c.—joints taped—5/8" SHEETROCK brand gypsum panels, FIRECODE C core</p>	UL Des U457	D
	<p>1/2" DUROCK exterior cement board—1 5/8" min., 20-ga. min. studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board screw-attached with 1 1/4" DUROCK steel screws 8" o.c.—joints taped—5/8" SHEETROCK brand gypsum panels, FIRECODE C core</p>	UL Des U458	E

2-Hour Walls**Steel-Framed/Non-Load Bearing**

	<p>Cavity Shaft Wall—1/2" DUROCK exterior cement board—5/8" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20-ga. min studs 24" o.c.—1 1/2" THERMAFIBER SAFB—cement board screw att with 1 5/8" DUROCK steel screws at 8" o.c. & laminated to gypsum panel with 4" strip DURABOND ceramic tile mastic applied with 1/4" notched trowel midway betw studs—joints fin</p>	UL Des U459	F
	<p>1/2" DUROCK exterior cement board—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—3 5/8" 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 5/8" DUROCK steel screws 8" o.c.—joints taped—double-layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior</p>	UL Des U474	G

Fine Finish—Spanish

Trowel on a smooth first coat. Apply a second coat using random, overlapping trowel strokes.



Coarse Finish—Float

Trowel on finish allowing aggregate to act as thickness gauge. Remove excess material. Float surface to achieve desired texture with plastic or wood float.



Fine Finish—Lace

Trowel on a first coat. Before surface moisture leaves, skip-trowel on second coat with trowel held flat. If desired, knock down finish with trowel.



Fine Finish—Sandstone

Trowel on finish allowing aggregate to act as thickness gauge. Using a plastic or wood float, float surface to achieve desired texture.

Long-Lasting, Textured Finish for Exterior Walls

DUROCK Exterior Finish is a durable, stucco finish that is used in conjunction with DUROCK Exterior Cement Board and is applied directly over DUROCK Exterior Basecoat material. DUROCK Exterior Finish comes in 21 standard colors and is fade and weather resistant. Custom colors are available on special order. Numerous textures can be created using conventional stucco tools and application techniques.

This elastomeric texture coating is based on a 100% acrylic polymer emulsion. DUROCK Exterior Finish is flexible and accommodates thermal expansion and contraction without cracking or delamination under normal conditions.

Typical installation time is 2 days with board erection, joint treatment, and basecoat application done on the first day. Installation begins with application of a required water barrier. Over the water barrier, DUROCK Exterior Cement Board is applied vertically or horizontally with DUROCK Screws or hot-dipped galvanized roofing nails spaced a maximum of 8" o.c. Prefill joints with DUROCK Exterior Basecoat; then embed 4" tape and level the joints. As an option, DUROCK Exterior Tape is applied over the joints and then DUROCK Exterior Basecoat is forced through the tape to completely fill and level the joints. This may require several passes. The treated joints must cure for a minimum of 4 hours. Next, DUROCK Exterior Basecoat is applied over the entire board area to provide a smooth uniform surface. After a 24-hour cure time, DUROCK Exterior Finish is applied to provide the desired texture.

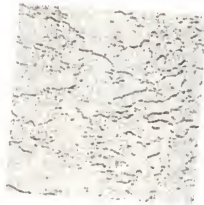
Benefits

Design Freedom—21 standard colors in two finishes (coarse and fine) plus numerous specialty colors offer many texture possibilities. Color and texture can be varied to contrast or complement glass and other exterior materials. Can be used in combination with ceramic tile, thin brick and stone aggregate finishes on the same base.

Two-day System—DUROCK Exterior Finish allows quicker occupancy, reduces labor and installed costs.

Superior Durability and Performance—Long lasting. Withstands high temperatures, humidity, water, wind, and repeated freeze-thaw cycles. Expands and contracts to accommodate thermal expansion and contraction of the substrate under normal conditions.



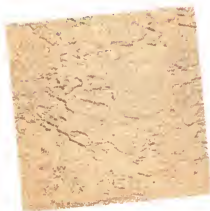


White

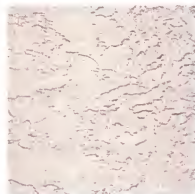


Desert

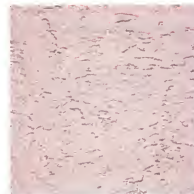
Malt



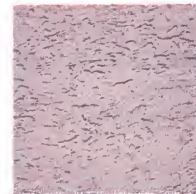
Savannah



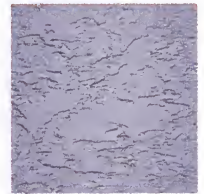
Cloud



Gray



Zinc



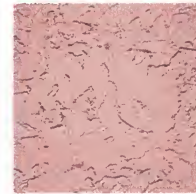
Colonial Blue



Canyon



Malt



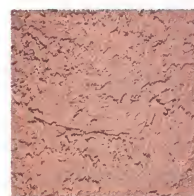
Mesa



Terra Cotta



Desert



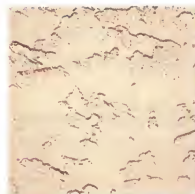
Cocoa



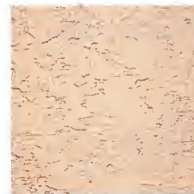
Sienna



Acorn



Buff



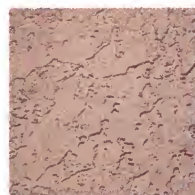
Yuma



Sunflower



Cortez Gold



Mesquite



Celadon



Savannah



Sequoia

Custom Colors Available On Special Order

Notice: These color reproductions show colors as closely as possible within printing limitations. For a more representative match to actual production material, see product samples offered by your sales representative.

Various textures may appear different in color due to shadowing effects.



Durock Exterior Cement Board

Material: Aggregated portland cement board with polymer-coated, glass-fiber mesh embedded in back and front surfaces.

Size: 1/2" thick, 4' wide, 8' long.

Edges: Formed, smooth, reinforced.

Ends: Square cut.

Weight: Approx. 3 psf for 1/2" thickness.

Packaging: Shipped palletized, 20 sheets per pallet.

Each pallet is stretch-wrapped and identified with pallet labels.

Durock Wood and Steel Screws

Developed especially for use with Durock Cement Boards. Wafer head design with countersinking ribs allows flush seating while preventing stripouts. Increased bearing surface provides greater push-off resistance. Neat, flush appearance makes finish material application easier. Special coating provides corrosion resistance superior to cadmium plating or zinc.

For 14 to 20-ga. Steel Framing: 1 1/4" and 1 5/8" Durock Steel Screws, Wafer Head, anticorrosive coating.

For Wood Framing: 1 1/4", 1 5/8" or 2 1/4" Durock Wood Screws, Wafer Head, anticorrosive coating.

Packaging: 1 1/4" screws, 5,000 pieces per carton; 1 5/8" screws, 4,000 pieces per carton; 2 1/4" screws, 2,000 pieces per carton.



Durock Exterior Tape

Material: polymer-coated, open mesh, glass-fiber tape.

Packaging: 12 rolls per carton, 300 linear ft./roll, 2" wide; 4 rolls per carton, 150 linear ft./roll, 4" wide.

Durock Latex Fortified Mortar

Material: ready-to-mix, thin-set mortar containing dry latex polymers, white or gray.

Approximate Coverage: For thin brick and tile systems: approximately 40-50 ft.²/50 lb. bag for 1/8" thick skim coat; approximately 80-90 ft.²/50 lb. bag for bond coat (back buttering not included).

Packaging: 50 lb. bags

Durock Latex Fortified Grout

Material: ready-to-mix grout containing dry latex polymers, white or gray.

Approximate Coverage: For tile systems: approximately 60-80 ft.²/50 lb. bag for 1/2" x 6" x 6" tile with 3/8" wide joints. For thin brick systems: approximately 30-45 ft.²/50 lb. bag for 1/2" x 2 1/4" x 8" thin brick with 3/8" wide joints.

Packaging: 50 lb. bags

Durock Exterior Basecoat

Material: Ready-to-mix portland cement mortar containing dry latex polymers, gray.

Approximate Coverage: 80-90 ft.²/50 lb. for 1/16" thick basecoat.

Packaging: 50 lb. bags.

Durock Exterior Finish

Material: Ready-mixed acrylic coating, fine or coarse finish.

Approximate Coverage: For fine float, 150-175 ft.²/pail; for coarse float, 100-125 ft.²/pail. Coverage varies with finish and texture. Minimum coating thickness 1/16", maximum 3/16".

Colors: 21 standard colors; custom colors available on request.

Packaging: 70 lb. net weight pails.

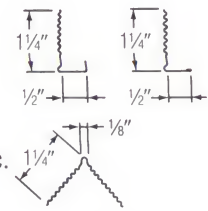
Durock Trim and Bead

Provide superior edge protection and corner reinforcement for Durock Cement Board System.

Metal Trim: Durock J-Trim (8')—zinc.

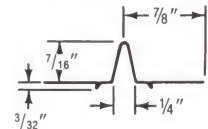
Durock L-Trim (8')—zinc.

Metal Bead: Durock Corner Bead (8')—zinc.



SHEETROCK Zinc Control Joint No. 093

Made of roll-formed zinc to resist corrosion. Plastic tape protects 1/4" wide, 7/16" deep opening and is removed after application of finish. Supplied in 10' length.



Durock Exterior Cement Board Physical Properties for 1/2" Thickness

Property	ASTM test ref.	Value
Flexural Strength - psi	C947-81	1000
Water Absorption - % by wt. 24 hrs.	C473-84	10
Nail Pull Resistance - lb., 0.4" head diameter (wet or dry)	C473-84	125
Weight - psf	C473-84	3
Freeze/Thaw Resistance - Procedure A number of cycles with no deterioration	C666-84	100
Surface Burning Characteristics—flame/smoke	E84-84	5/0
Min. Bending Radius*—ft.	—	8

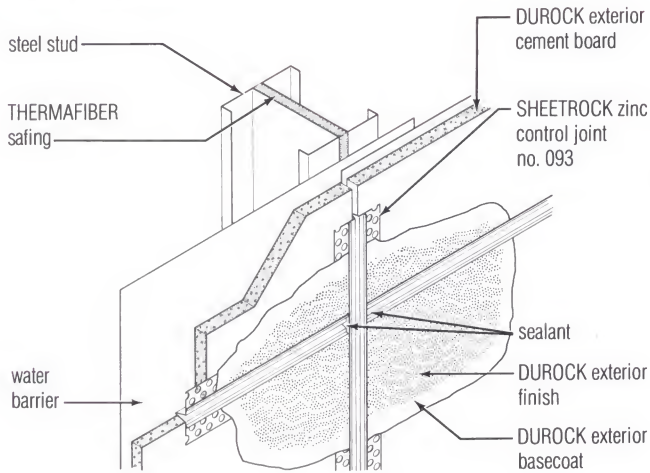
*Requires special framing. Details available on request.

Thermal Properties

Thickness (in)	Product	"R"
3	THERMAFIBER SAFB	11.1
3 1/2	THERMAFIBER FS-15	13.0
1/2	SHEETROCK brand Gypsum Panels	0.45
5/8	SHEETROCK brand Gypsum Panels	0.56
1/2	DUROCK Exterior Cement Board	0.26

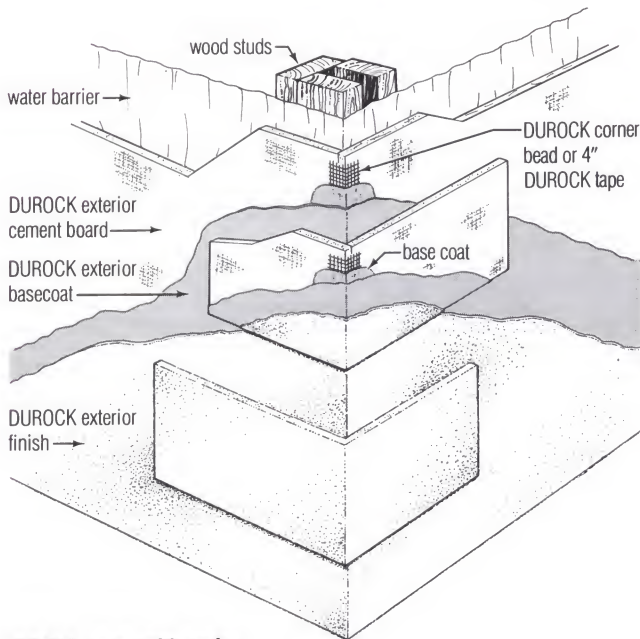
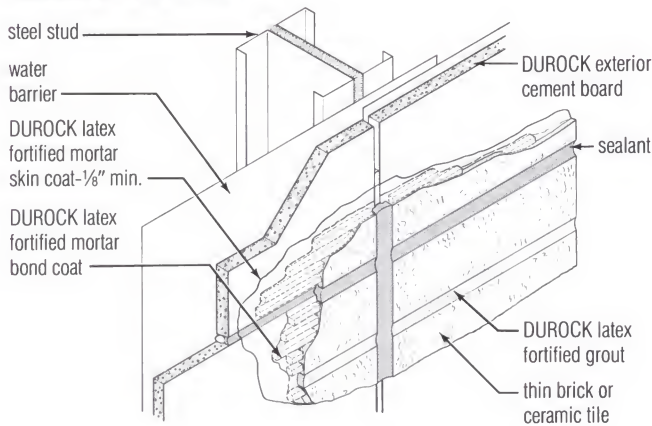


DUROCK exterior finish

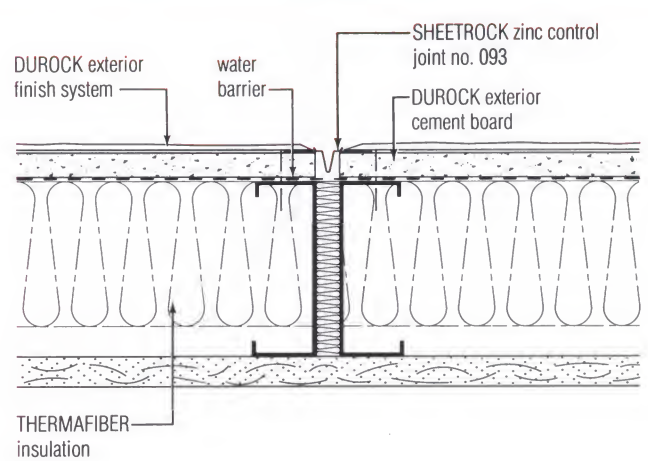


Control joint intersections

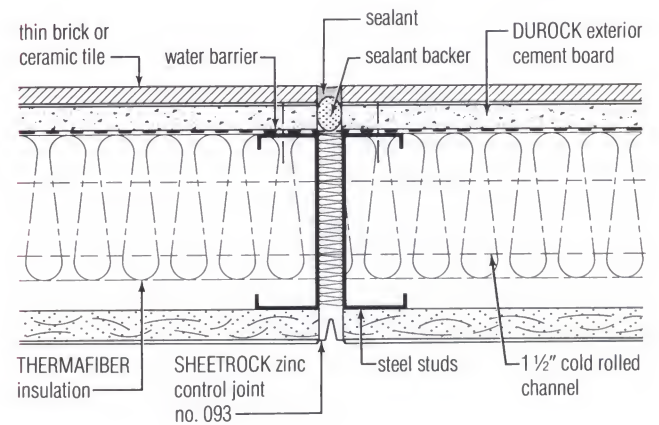
Thin Brick or Ceramic Tile



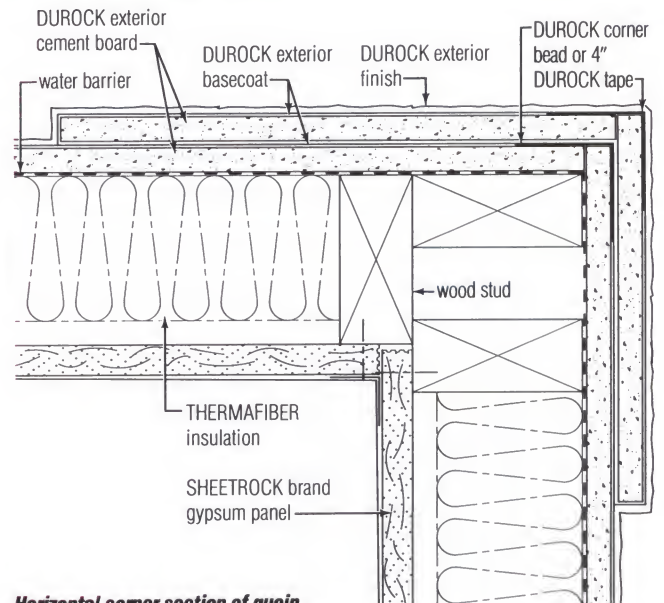
DUROCK corner with quoins



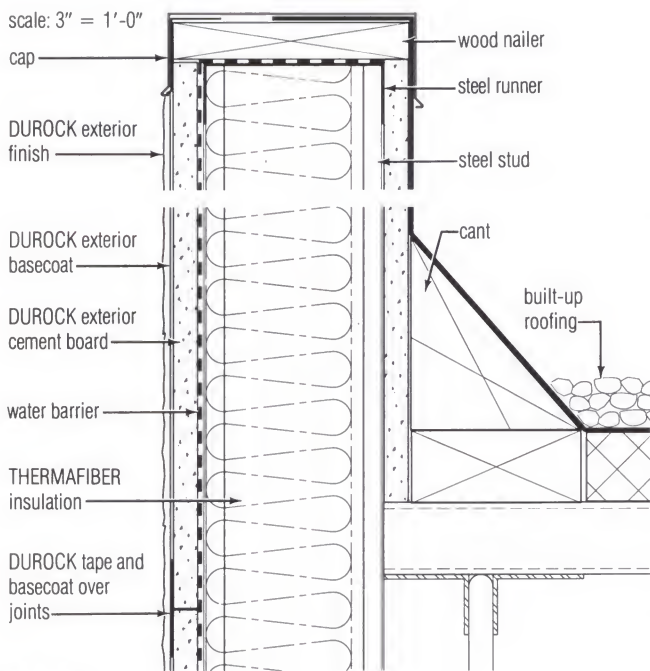
Vertical surface control joint



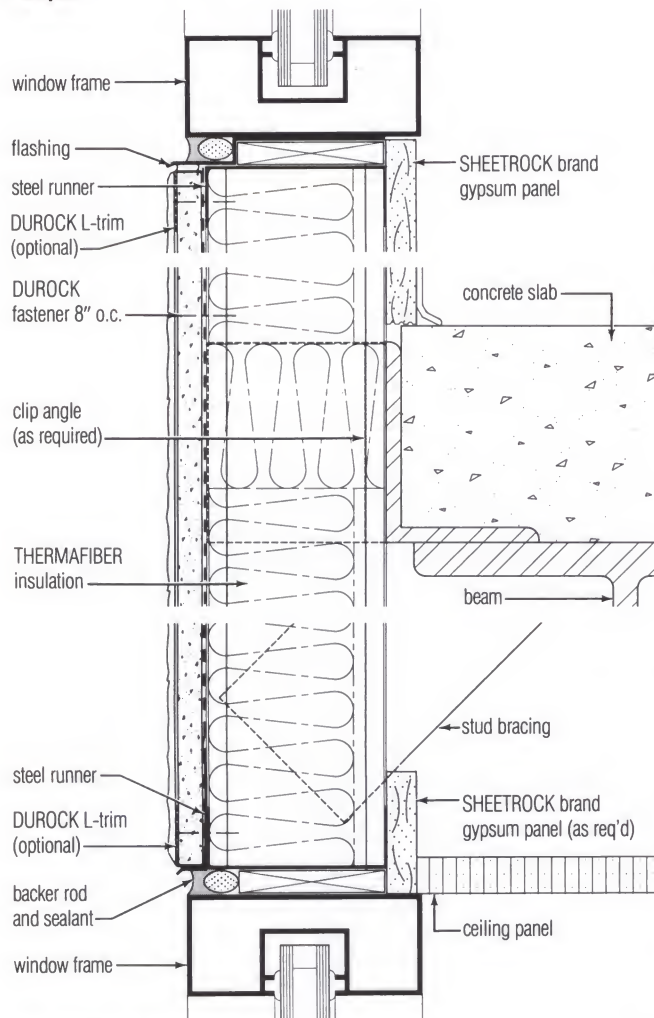
Vertical building control joints



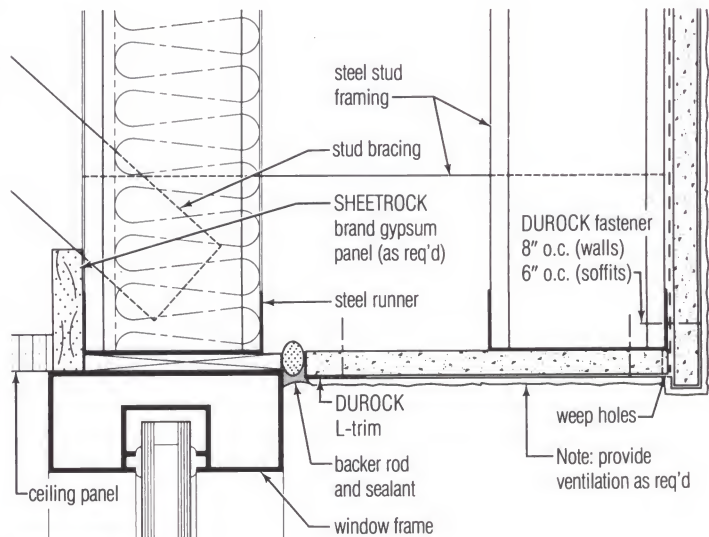
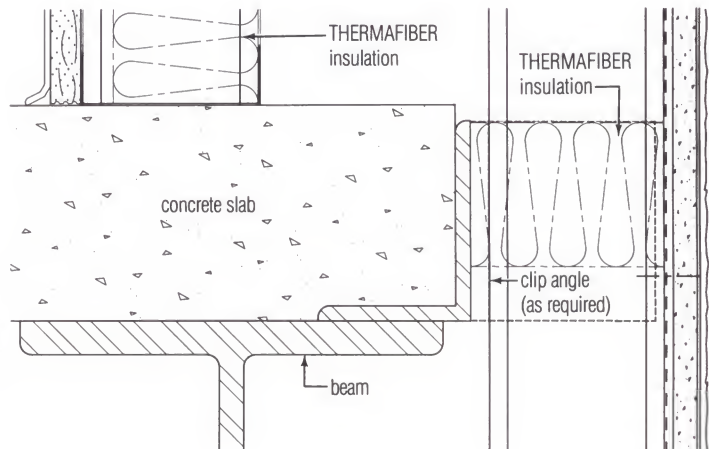
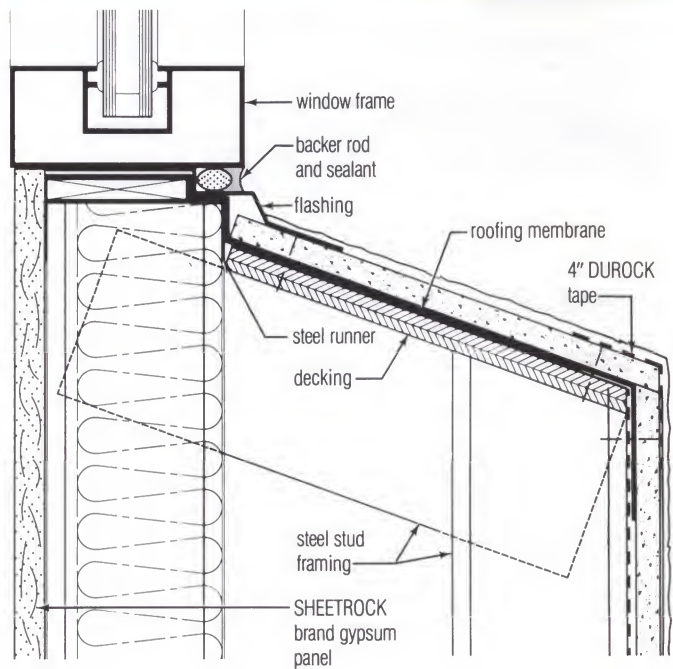
Horizontal corner section of quoin



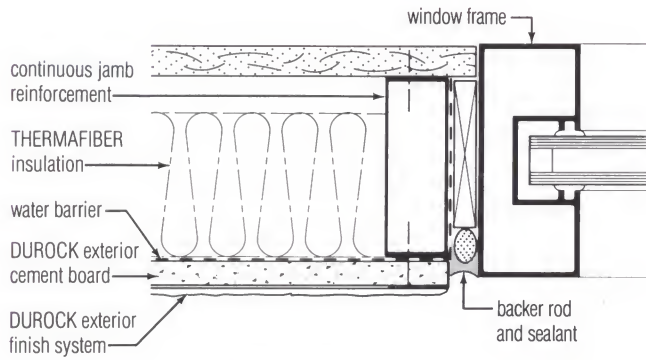
Parapet



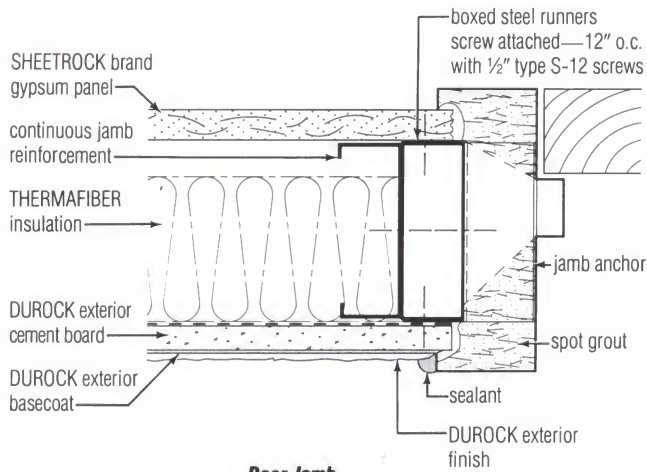
Stud bypass—Intermediate floor



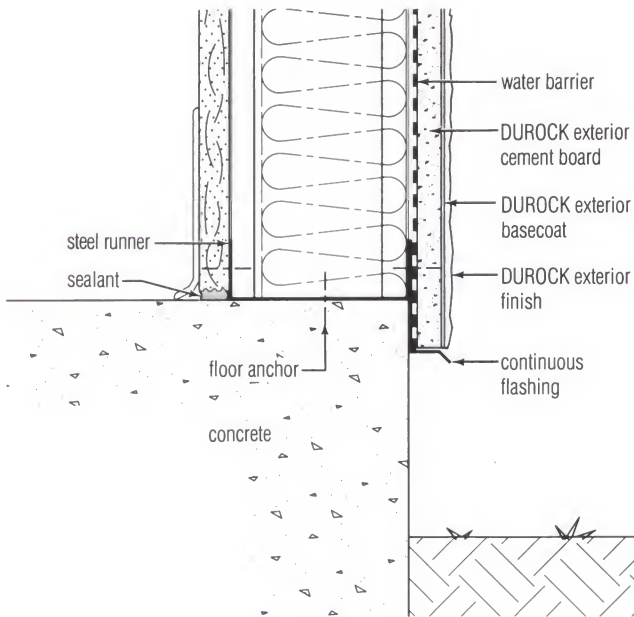
Spandrel wall



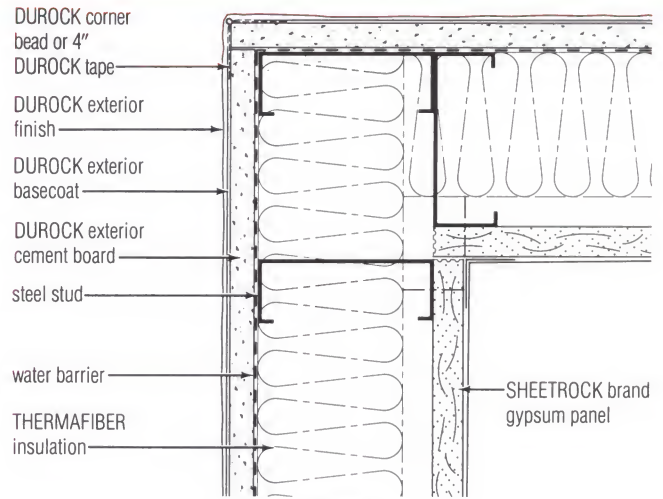
Window jamb



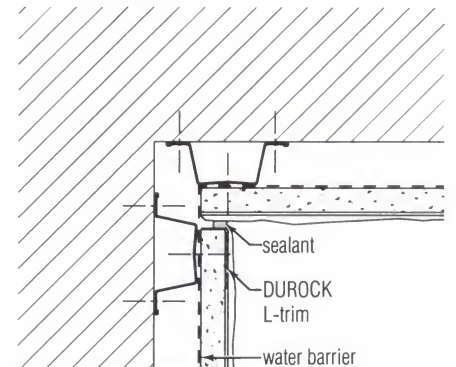
Door Jamb
50 to 200-lb.
(Head similar)



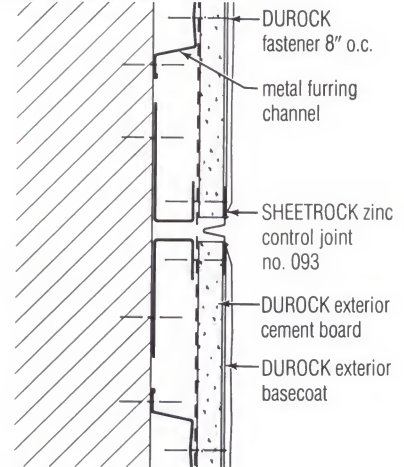
Foundation



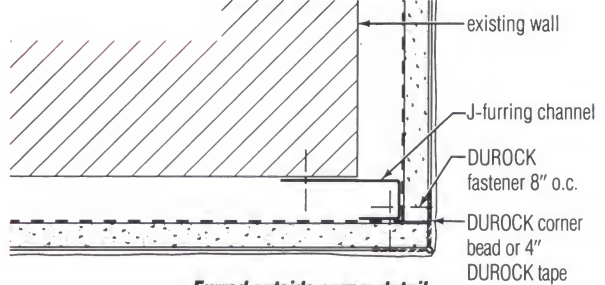
Corner



Furred inside corner detail



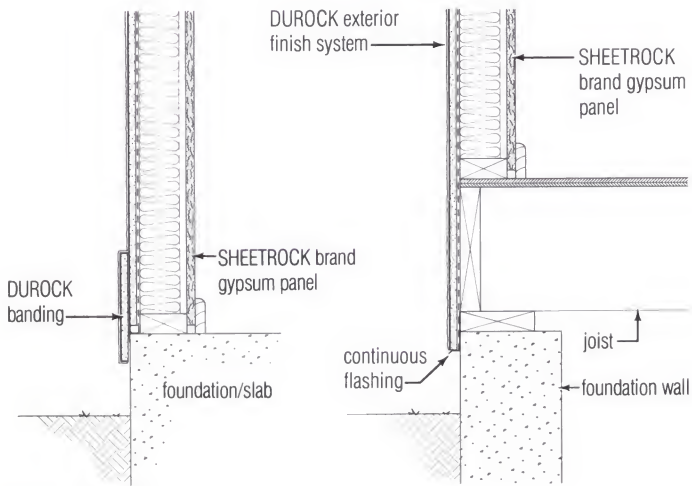
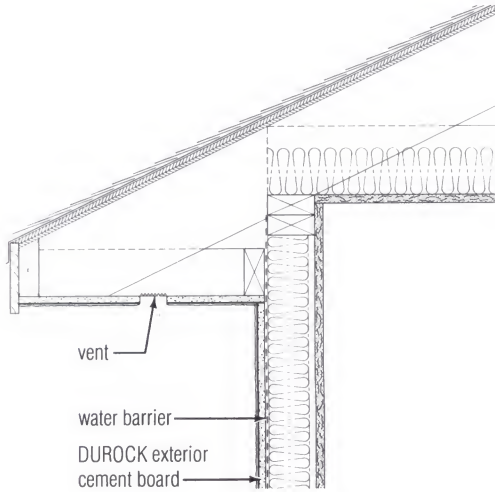
Furred control joint detail



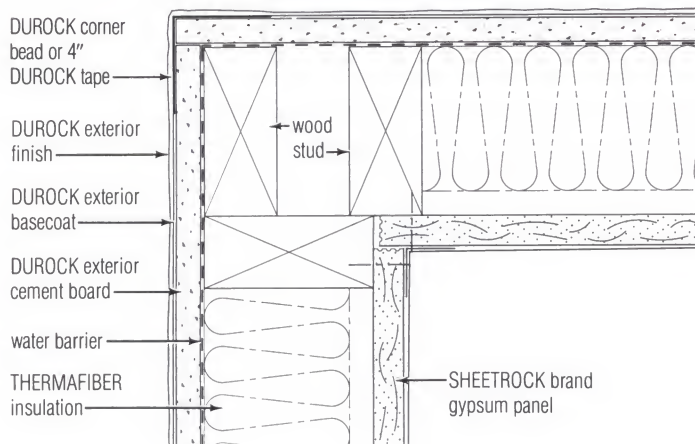
Furred outside corner detail

scale: 1½" = 1'-0"

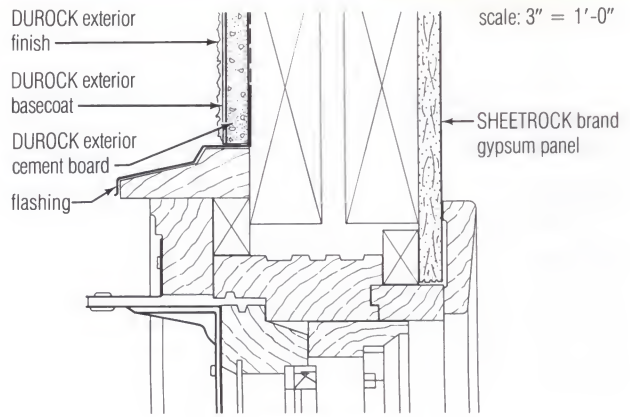
Soffit



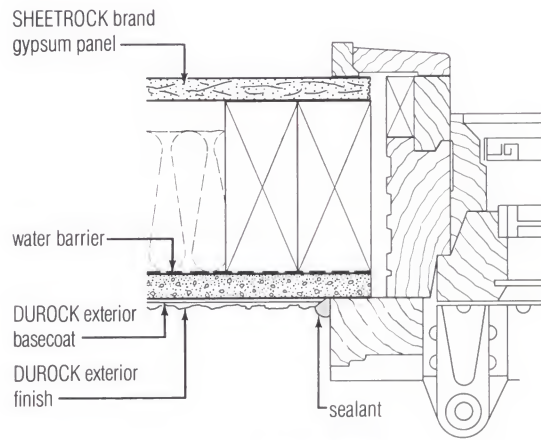
Foundation walls



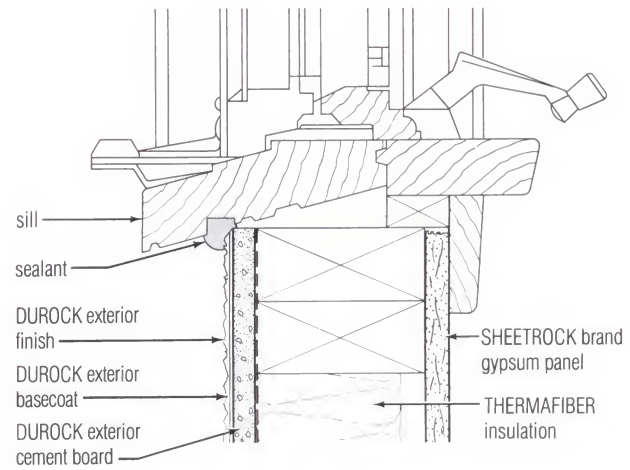
Corner



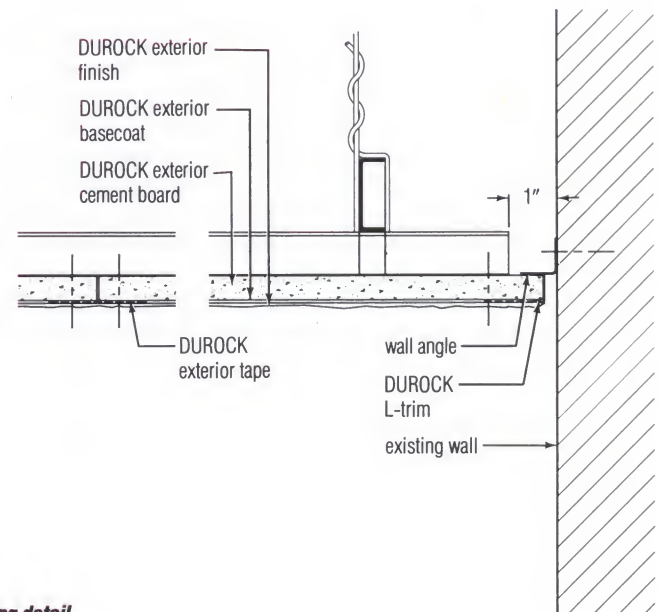
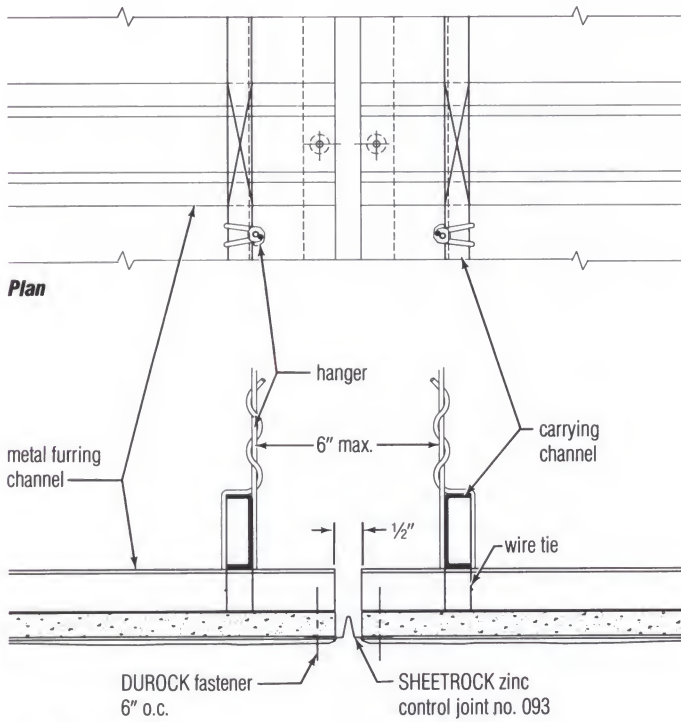
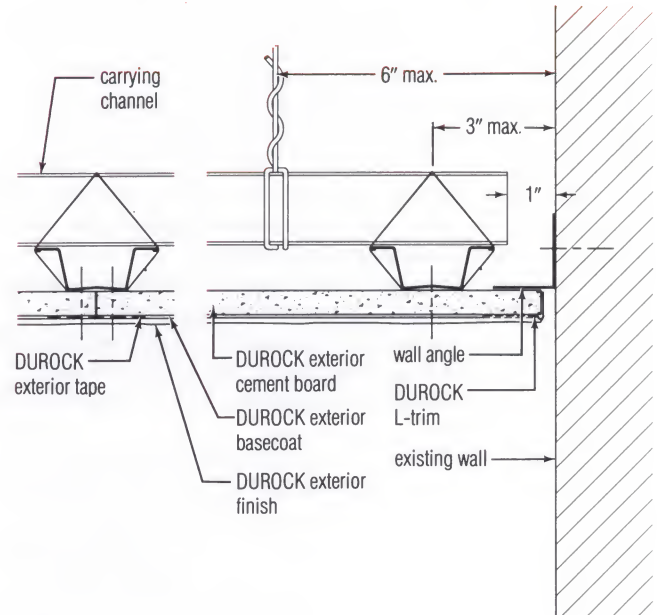
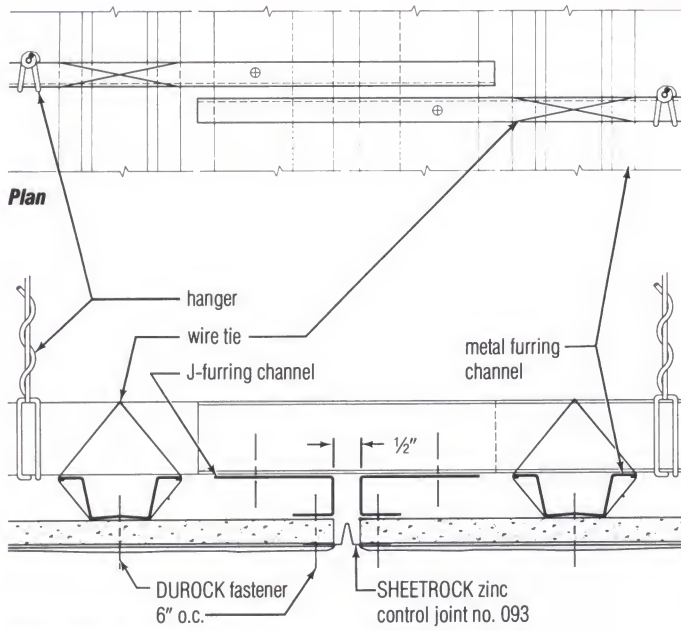
window head
(door similar)



window jamb
(door similar)



window sill
(door similar)



Suspended ceiling detail

1 System Performance—These specifications are for load-bearing and non-load bearing exterior systems with securely attached interior and exterior facings. The four systems covered herein have been tested and evaluated for use as described. For other system applications, consult with your local representative.

All details, specifications, and data contained in this literature are intended as a general guide for using DUROCK Exterior Cement Board Systems. These products must not be used in a design or construction of any given structure without complete and detailed evaluation by a qualified structural engineer or architect to verify suitability of a particular product for use in the structure.

Information in this publication should be used only for DUROCK Exterior Cement Board Systems, as physical properties of competitive products may vary. United States Gypsum Company assumes no liability for failure resulting from the use of alternative materials or improper application or installation of DUROCK Exterior Cement Board Systems as specified herein.

United States Gypsum Company will provide building officials and design professionals, upon written request, with test certification for published fire and structural data covering systems constructed with Company products and assembled to meet performance requirements of established test procedures specified by various agencies.

2 Fasteners—Specify 1¼" or 1½" DUROCK Steel Screws for 14 to 20-ga. framing. Corrosion-resistant DUROCK Screws must be used for screw-attaching all cement board and may be used for other exterior system accessories. Specify 1¼" or 1½" DUROCK Wood Screws or 1½" 11-ga. hot-dipped galvanized roofing nails with nominal 7/16" diameter head for attaching cement board to wood studs; 2¼" DUROCK Wood Screws for attaching cement board over approved ½" rigid foam insulation, plywood, or gypsum panels to wood studs. When installing trim accessories use hot-dipped galvanized roofing nails or staples (stainless steel or monel) with ¼" to ¾" long legs and ½" crown.

3 Window and Door Openings—All window and door openings must be properly flashed and caulked. Grout exterior steel door frames with portland cement mortar.

4 Shadowing and Spotting—When the outside temperature differs considerably from the building's interior temperature, airborne dirt can accumulate on the colder regions of walls causing "shadowing" or "spotting", particularly over fasteners and framing. This is a natural phenomenon which occurs through no fault in the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable blemishes, provide a thermal separation between the interior and exterior faces.

5 Expansion and Contraction—Exterior wall surfaces should be isolated with surface control joints (sometimes referred to by the industry as expansion joints) or other means where: (a) a wall abuts a structural element or dissimilar wall or ceiling; (b) construction changes within the plane of the wall.

Location of building control joints must be detailed by the architect. Surface control joint spacing for the DUROCK Exterior Finish System is 20' in either direction; for tile and thin brick finishes, max spacing is 16' in either direction. Steel framing at building control joints that extend through the wall (with top and bottom runner tracks broken) should have 1½" cold-rolled channel alignment stabilizers spaced a maximum of 5'0" o.c. vertically. Channels should be placed through holes in the stud web of the first two adjacent studs on both sides of the joint and securely attached to the first adjacent stud on either side of the joint.

Cement board should be separated at all surface and building control joints. Where vertical and horizontal joints intersect, the

vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant complying with architectural practices and sealant manufacturer recommendations. Do not apply tile or finishes over caulked or sealed expansion joints.

Cement board should be separated at all surface and building control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant complying with architectural practices and sealant manufacturer recommendations. Do not apply tile or finishes over caulked or sealed expansion joints.

6 Air and Water Infiltration—Flashing and sealants as shown in the details must be provided to resist air and water infiltration.

DUROCK Cement Board is not a water barrier. A water barrier must be installed over the studs with a 2" overlap or stapled to the back of the DUROCK Exterior Cement Board before it is applied. DUROCK Exterior Cement board must be clean and dry before application of exterior finishes. Also, for ceramic tile and thin brick, a ⅛" min. thick skim coat of DUROCK Latex Fortified Mortar must be applied to the exterior surface of the DUROCK Exterior Cement Board and allowed to set 24 hours. Accessories for exterior finishes should be made of zinc alloy.

7 Swimming Pool Enclosures—In areas of high moisture and chlorine content, adequate consideration should be given for metal hangers and framing members to assure protection against deterioration and for ventilation of excess moisture.

8 Soffits and Ceilings—DUROCK Exterior Cement Board Systems finished with ceramic tile, thin brick and DUROCK Exterior Finish may be used on properly vented soffits and ceilings with DUROCK Screws spaced 6" o.c. max. A qualified structural engineer should evaluate design including uplift bracing.

9 Leaching and Efflorescence—Latex leaching and efflorescence are natural phenomena which occur with the use of latex modified mortars and grouts through no fault in the products. To help protect against their occurrence, follow current industry guidelines and recommendations.

10 Vapor Retarders—Humidity and temperature conditions may require a vapor retarder. Its location should be determined by a qualified engineer to prevent moisture condensation within the wall.

11 Note—United States Gypsum Company reserves the right to make improvements in, or change materials and/or configurations of any products in this catalog, without prior notice and without obligation to incorporate the changes or improvements in items already manufactured.

12 Technical Assistance and Consultation are readily available from experienced technical representatives. For technical assistance on DUROCK Exterior Cement Board Systems and preparing project specifications, contact United States Gypsum Company technical services: Glendale, CA (818) 956-1882; Atlanta, GA (404) 393-0770; Chicago, IL (312) 606-5475; Tarrytown, NY (914) 332-8000.

13 Additional Information—See product folders in this series: *Gypsum Panels & Accessories* folder SA-927 for information on system components; *DUROCK Interior Cement Board* folder SA-932 for interior ceramic tile base specifications; *Plaster Products, Accessories and Systems* folder SA-920 for plaster system components; *THERMAFIBER Life-Safety Insulation Systems* folder SA-707 for data on insulation and mineral fireproofing; *Drywall/Steel-Framed Systems* folder SA-923 for load-bearing and non-load bearing steel framing systems.

Part 1: General

1.1 Scope—Specify to meet requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

Finishes, skim coats and basecoats shall not be applied to exterior cement board that is wet, frozen or contains frost. After application, and for at least 24 hours, finishes, skim coats and basecoats shall be effectively protected from rain and excessive moisture.

In cold weather and during finish applications, DUROCK Exterior Board, skim or basecoat, mortar, finish material and air temperature must be at least 45°F and must remain at this temperature or higher for at least 24 hours after application. Hot and dry weather may affect working time of skim or basecoat and finish materials. Under rapid drying conditions, dampening of board, skim or basecoat surface may be required to improve workability.

1.5 Framing

Steel or wood framing to receive DUROCK Exterior Cement Board shall be structurally sound, free from bow, and in general compliance with local building code requirements. Damaged and bowed framing shall be replaced before installation of DUROCK Exterior Cement Board.

Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection for tile and thin brick finishes, L/240 for DUROCK Exterior Finish and EIFS. Steel framing must be 20-ga. or heavier with a corrosion-resistant metal coating equivalent to G60 hot dipped galvanized.

Part 2: Products

2.1 Materials supplied by United States Gypsum Company.

A Cement Board—DUROCK Exterior Cement Board, ½" thickness, 48" width, 8' length. Custom lengths available.

B Fasteners—DUROCK Steel Screws, 1¼" or 1½" Wafer Head, with anticorrosive coating, for 14 to 20-ga. steel framing; DUROCK Wood Screws, 1¼", 1½" or 2¼", Wafer Head, anticorrosive coating, for wood framing.

C Joint Reinforcement—2" or 4" wide, DUROCK Exterior Tape, open weave.

D Skim and Bond Coats—Meeting ANSI A118.4: DUROCK Latex Fortified Mortar, (white or gray), for ceramic tile and thin-brick finishes.

E Grout—Meeting ANSI A118.6: DUROCK Latex Fortified Grout (white or gray) for ceramic tile and thin-brick finishes.

F Basecoat for Durock Exterior Finish System—DUROCK Exterior Basecoat, gray, ready-to-mix portland cement mortar containing dry latex polymers.

G Finish Coat for Durock Exterior Finish System—DUROCK Exterior Finish, ready-mixed acrylic coating, available in 21 standard colors, (fine or coarse).

H Interior Surfaces—

1 Gypsum Panels—(specify from *Gypsum Panels and Accessories* folder SA-927.)

2 Veneer Plaster—(specify from *Plaster Products, Accessories and Systems* folder SA-920).

3 Ceramic Tile—(specify from *DUROCK Interior Cement Board* folder SA-932).

I Insulation—THERMAFIBER Mineral Fiber Insulation (specify from *THERMAFIBER Life Safety Insulation Systems* folder SA-707).

J Control Joint—SHEETROCK Zinc Control Joint No. 093.

K Metal Trim—DUROCK ½" J-Trim and DUROCK ½" L-Trim.

L Corner Reinforcement—DUROCK Corner Bead or 4" DUROCK Tape.

M Caulking—SHEETROCK Acoustical Sealant for interior applications.

2.2 Materials by Other Suppliers

A Epoxy matrix and stone aggregate (contact epoxy matrix supplier for suitability and application).

B Thin-brick (contact supplier for suitability).

C Exterior grade ceramic tile (contact supplier for suitability).

D EIFS (contact supplier for suitability).

E Membrane—

1 TYVEK Housewrap.

2 No. 15 asphalt felt.

3 Grade D, 60 minute building paper or equivalent.

F Sheathing Substrates—Max. ½" thick extruded polystyrene or polyisocyanurate rigid foam insulation, exterior grade gypsum sheathing or exterior grade plywood.

G Staples—½" crown, ¼" to ⅜" leg, galvanized, monel or stainless, for attaching membrane and trim accessories.

H Nails—1½" long, 11-ga., hot dipped galvanized roofing nails with nominal ⅞" diameter head (obtain locally) for wood framing.

I Sealant—manufacturer's approved for exterior applications.

Part 3: Execution**3.1 Framing Erection**

Space wood and steel framing a maximum of 16" o.c. (24" o.c. for EIFS). Adequate diagonal bracing meeting design requirements must be installed flush with the framing members prior to application of DUROCK Board. The studs of freestanding furred walls must be secured to exterior wall with wall furring brackets or laterally braced with horizontal studs or runners spaced 4' o.c. max.

3.2 Membrane—Water Barrier

A For steel framing, secure membrane with tape or adhesive and immediately apply DUROCK Exterior Cement Board, or staple membrane to back of DUROCK Exterior Cement Board with ½" crown, ¼" to ⅜" leg staples. Extend membrane 2" to 3" beyond board edges and lap membrane at joints in shingle-like manner to prevent water penetration into stud cavity.

B For wood framing, plywood or gypsum sheathing, staple membrane and immediately apply DUROCK Exterior Cement Board.

3.3 Durock Exterior Cement Board Application

A Apply DUROCK Exterior Cement Board with rough side towards exterior and with ends and edges over supports. Fit ends and edges closely, but not forced together. For DUROCK Exterior Cement Board with staple-attached membrane, apply in a shingle-like manner beginning at bottom of wall. Stagger end joints in successive courses.

B Fasten DUROCK Exterior Cement Board to framing with specified fasteners. Drive fasteners in field of DUROCK Exterior Cement Board first, working towards ends and edges. Hold DUROCK Exterior Cement Board in firm contact with framing while driving fasteners. Space fasteners max. 8" o.c. for walls, 6" o.c. for ceilings, with perimeter fasteners at least ⅜" and less than ⅝" from ends and edges. Drive nails and screws so bottom of heads are flush with surface of DUROCK Exterior Cement Board, to provide firm panel contact with framing. Do not overdrive fasteners.

3.4 Joint Reinforcement

For tile and thin brick finishes, prefill joints with DUROCK Latex Fortified Mortar. Embed DUROCK Exterior Tape centered over all joints and corners but not overlapped. For DUROCK Exterior Finish System, prefill joints with DUROCK Exterior Basecoat and then immediately embed 4" tape and level the joints. As an alternative, apply DUROCK Exterior Tape over joint and then apply DUROCK Latex Fortified Mortar or DUROCK Exterior Basecoat, forcing it through tape to completely fill and level joints. This may require several passes. For exposed aggregate finishes, apply DUROCK Exterior Tape and immediately apply the required thickness of coating over entire surface and embed stone aggregate according to manufacturer's directions.

3.5 Trim Accessories

When specified, DUROCK trim accessories are applied using hot dipped galvanized roofing nails, monel or stainless staples. Space staples 6" to 9" o.c. in each flange.

For DUROCK Exterior Finish System, treat trim accessories with basecoat and level with adjacent board areas. Fill all voids and depressions with basecoat and feather mortar edges. The treated joints and trim areas must be allowed to cure for a minimum of 4 hours before application of basecoat.

3.6 Exterior Finish—

3.6.1 Durock Exterior Finish System—

A Basecoat—Apply a 1/16" minimum thick, uniform layer of DUROCK Exterior Basecoat over the entire surface after joints and trim have cured a minimum of 4 hours. Leave surface smooth and flat. Under rapid drying conditions, dampen surface as necessary to improve workability. Allow basecoat to cure 24 hours before application of DUROCK Exterior Finish Coat.

B Finish Coat—Trowel-apply DUROCK Exterior Finish in a 1/16" minimum thick, uniform layer over all base-coated surfaces. Do not add sand or other additives to create heavier textures (material is not designed for texture heavier than 3/16"). If necessary, adjust consistency and working properties by adding up to 8 oz. clean water per 70 lb. pail of finish material. Add the same amount of water to all subsequent pails to ensure color uniformity. Mix well for uniform consistency. Texture as required, using plastic or wood floats. (Note: steel floats may cause discoloration.)

3.6.2 Thin Brick and Ceramic Tile Systems—Apply a 1/8" min. thick skim coat of DUROCK Latex Fortified Mortar over DUROCK Board surfaces. Apply skim coat uniformly over entire surface. Leave surface smooth and flat. Allow to set 24 hours before application of bond coat for setting tile and thin brick.

Ceramic tile and thin brick on walls may not exceed 3/4" thickness, 18"x18" size, and 10 psf. Install (thin brick) (ceramic tile) in accordance with ANSI 108.5 specifications and manufacturer's directions. Using the notched trowel required for the thickness of thin brick or tile being installed, apply DUROCK Latex Fortified Mortar to obtain uniform setting bed. Back-butter the (thin brick) (ceramic tile) for 100% mortar contact. Install units by firmly pressing them into freshly applied mortar. Use a sliding and twisting motion to embed units and obtain a 100% mortar contact. Beat-in ceramic tile in accordance with accepted practice. Apply DUROCK Latex Fortified Grout after mortar has set firmly for 24 hours. Mix and apply grout according to directions on package. Force maximum amount of grout into joints. Tool and compress grout into joints to provide neat and uniform appearance. Clean grout from finished surfaces and cure installation as required by ANSI A108.10 Specification.

3.6.3 Epoxy Matrix System—DUROCK Exterior Cement Board is a suitable substrate for many epoxy matrix stone aggregate products. Contact epoxy matrix suppliers regarding suitability of their products

for this use. Mix and apply epoxy material directly to the taped DUROCK Exterior Cement Board surface according to manufacturer's directions. Follow immediately with specified aggregate application.

3.6.4 Layered Details

To create bands, quoins, dentils and other layered details, cut DUROCK Exterior Cement Board to specified size and shape. Laminate to basecoated DUROCK Exterior Cement Board following same application procedure as with ceramic tile.

3.7 Durock Exterior Finish Applied to Concrete or Masonry

Prior to application of basecoat, new poured-in-place concrete construction should be allowed to cure for 28 days and all structural cracks and large surface voids must be filled and leveled. For new construction, the joints between the concrete masonry units should be struck flush. For existing construction the joints must be pre-filled with DUROCK Exterior Basecoat. For poured-in-place concrete, any ridges caused by form separation shall be leveled. Small surface voids (i.e. cracks, spalled areas) must be pre-filled with DUROCK Exterior Basecoat and allowed to cure for 24 hrs. prior to the actual basecoat application. Several coats may be required. Allow basecoat to cure a minimum of 4 hours between each coat.

Apply DUROCK Exterior Basecoat and DUROCK Exterior Finish as stated in 3.6.1 above.

3.8 Wall Furring Applications

For new construction or renovation, contact your local United States Gypsum Company representative for specifications and details on Z-furring and DWC-furring systems.

3.9 Exterior Insulation and Finish Systems

Install DUROCK panels as stated in 3.3 above. Apply EIFS per manufacturer's recommendation using the full bond method for attachment of foam insulation.

Disclaimer

United States Gypsum Company does not in any way recommend or approve any exterior wall assemblies other than those specifically set forth in its current printed literature and shall have no liability for any difficulties or failure resulting from the use or installation of products contrary to United States Gypsum Company recommendations or specifications, including the use of its products along with those of other manufacturers or use in unapproved systems.

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Patents: DUROCK Cement Board is covered by the following patents: 4,916,004; 4,450,022; 4,488,909; and 4,504,335.

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